

BUSINESS WARGAME FOR INFORMATION SECURITY

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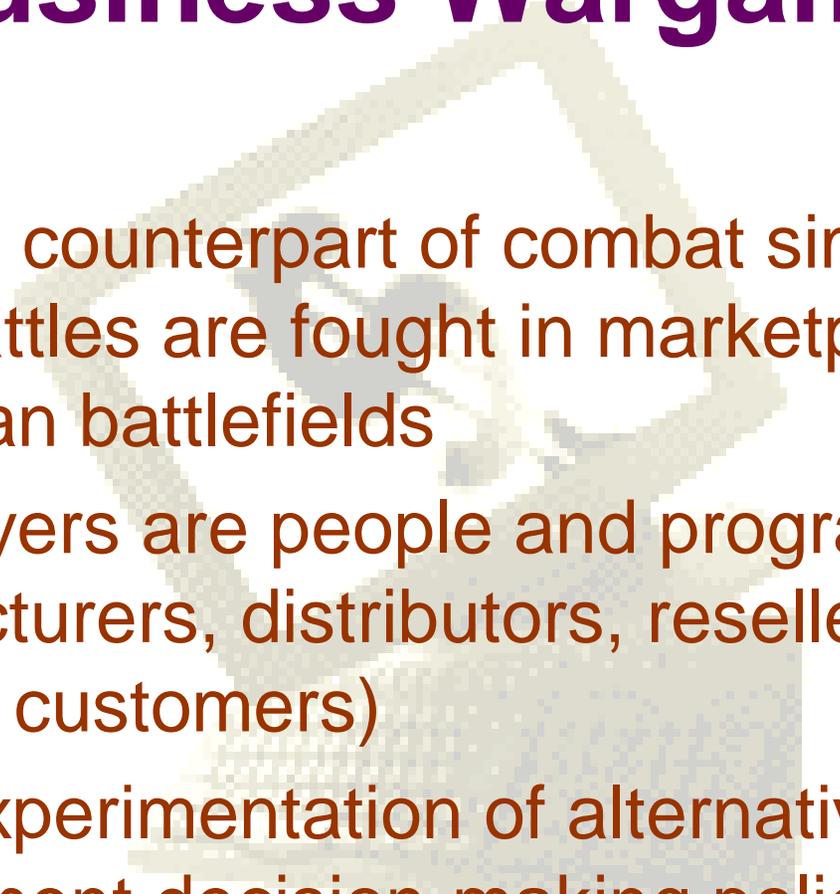
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Business Wargame



- Business counterpart of combat simulation, where battles are fought in marketplace rather than battlefields
- Main players are people and programs (manufacturers, distributors, resellers, and business customers)
- Allows experimentation of alternative management decision-making policies under pre-specified scenarios

Synthetic Environment for Analysis and Simulations



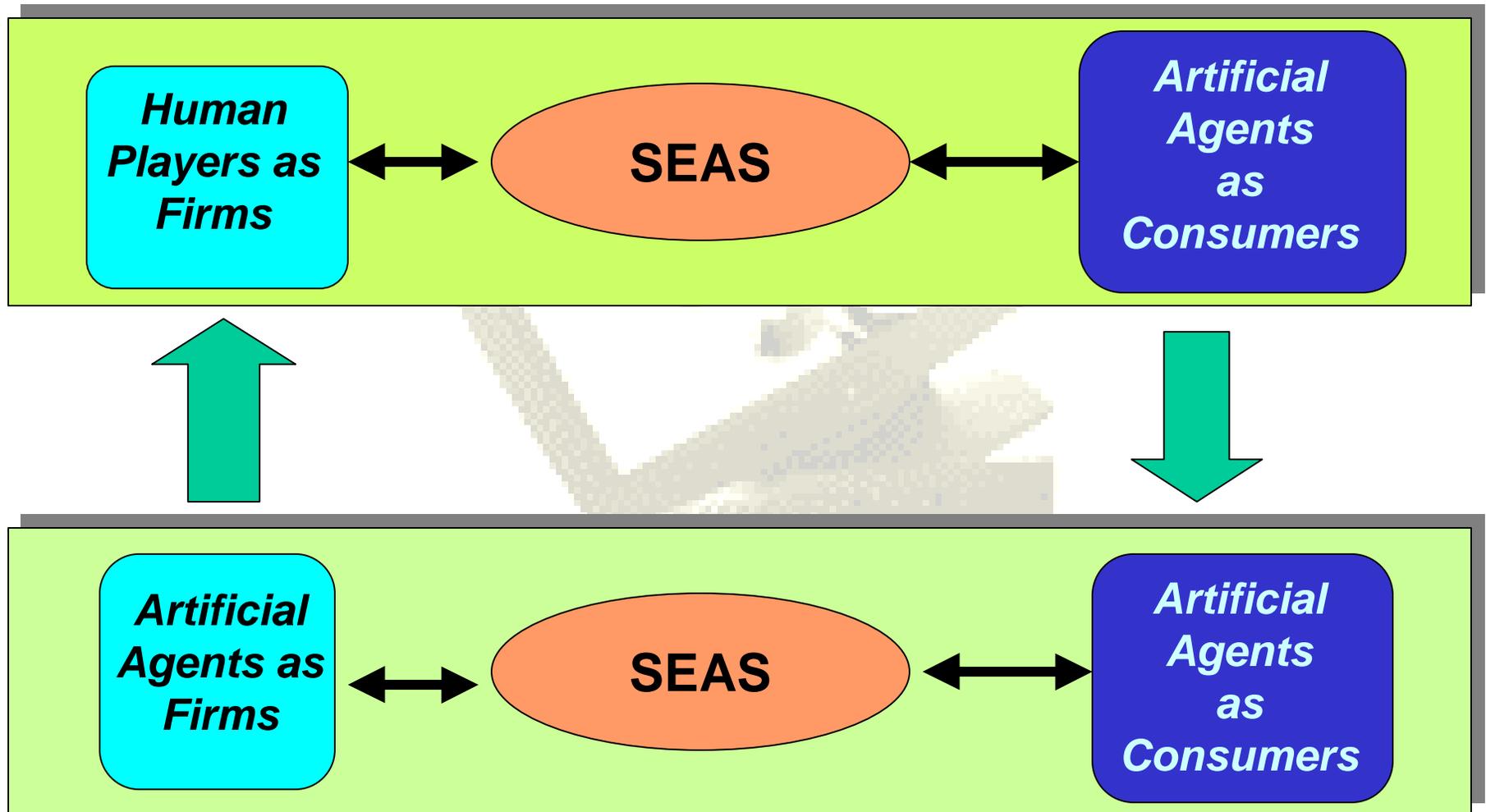
Synthetic Environment for Analysis and Simulations -- SEAS

- A synthetically created economy with configurable goods and services, stock, bond, labor, and currency markets.
- In these markets two types of agents interact
 - **live:** people acting as firms, regulators, intermediaries.
 - **virtual:** artificially intelligent software agents behaving like human agents in a narrow domain

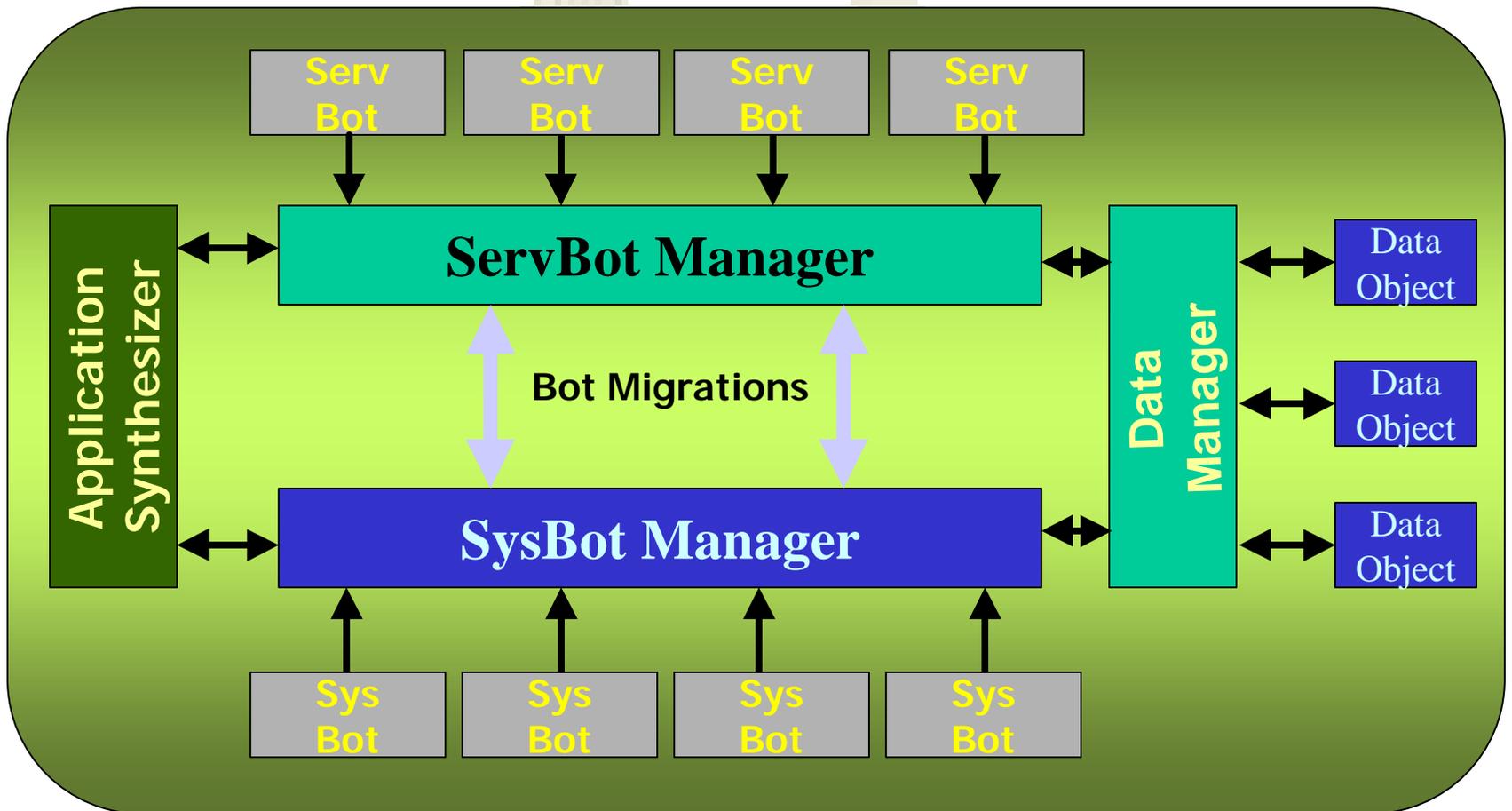
Technical Features

- Web-based distributed computing environment that is robust and fault tolerant
- Employs a state-of-the-art networking, collaboration, data-warehousing and knowledge management technologies
- Employs genetic algorithms that allow for re-configurable systems

Experimental Framework



Re-configurable Architecture -- System



Economic Features

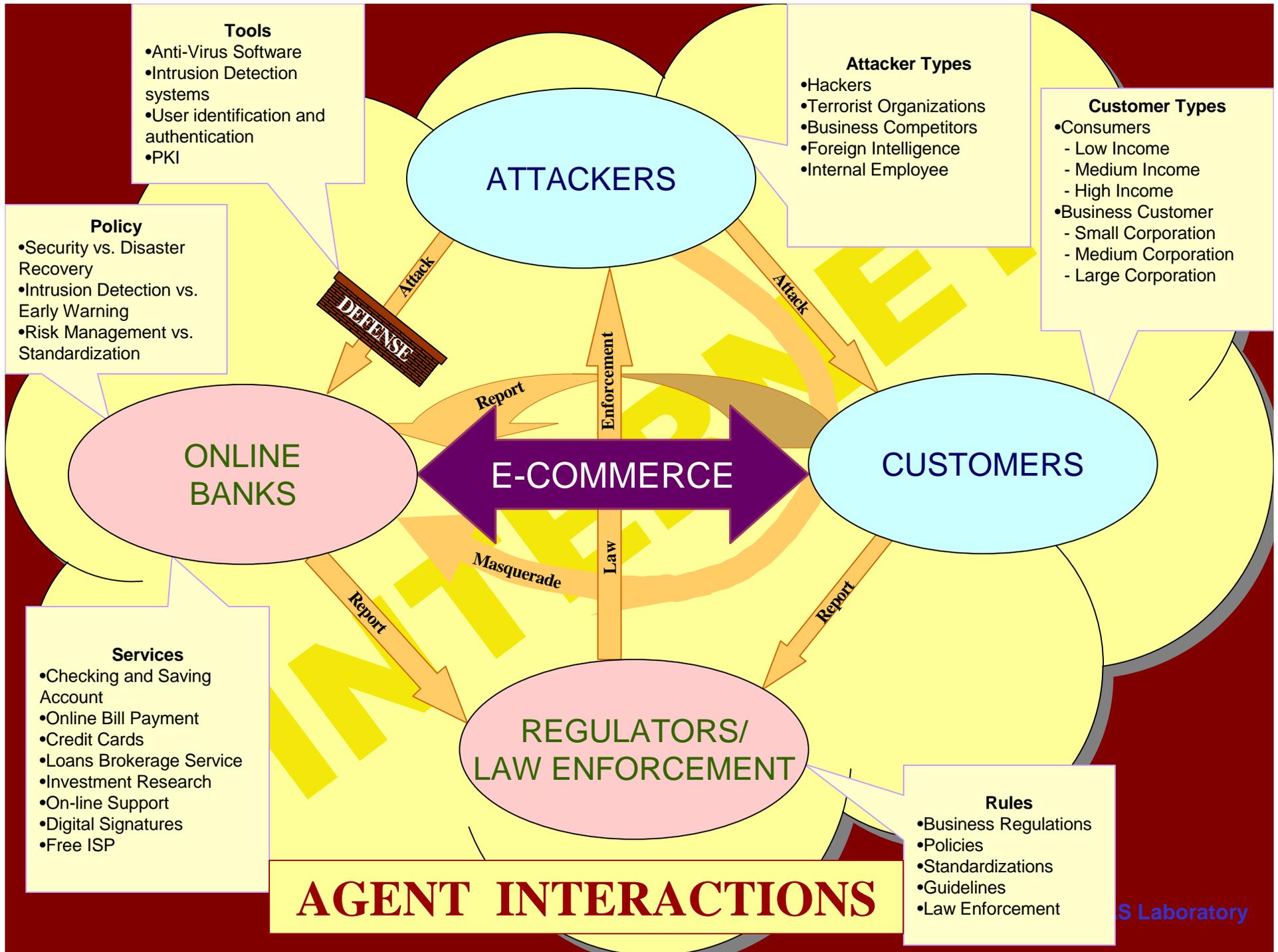
- Global economy can be modeled as a collection of inter-linked national economies
- Each national economy can be governed separately
- Production and demand process can be arbitrarily complex and can be plugged seamlessly
- Can incorporate all features of government, including the legislative, executive and judicial branches
- Can incorporate external and environmental variables pertaining to technical change, growth or societal shifts

Management Features

- Supports a full complement of management functionalities such as strategy, production, marketing, finance, and human resources
- SEAS can be configured to model any firm, in any industry, in any economy at any level of detail
- Can incorporate quantitative relationships as well as qualitative relationships which can be calibrated using actual data and can be updated in real time

Organizational Features

- Records participants' every action and communication
- Can accommodate arbitrarily large numbers of human and artificial agents playing in the same setting
- Provides high level of decision making and analytical tool to every participant
- Allows teams to collaborate internally by sharing the various decision making functions across several different entities
- Has a highly evolved visualization and decision support system that allows human players to rapidly assimilate and use the large quantity of real time information



Agents' Behaviors -- Firms

- The conservative firms invested in security early and often and achieved higher cash balances
- These firms were protected against attempted attack and were able to focus on core business activities
- The speculative firms with no defense made money early, but once they suffered losses due to attacks could not fully recover to compete effectively for the duration of the game

Agents' Behaviors -- Firms

- The belligerent firms that invested heavily in offensive capabilities and resorted to offenses against their competitors did not fare well
- These firms attracted the attention of the competitive organizations and exposed themselves to attacks from other firms and governments
- The firms that indulged in intelligence gathering activities had mixed results
- Intelligence gathering made these firms loose focus and also cost substantial amount of capital-- artificial agents may perform better than humans on this account

Agents' Behaviors -- Perpetrators

- The terrorist organizations that invested heavily in intelligence gathering capabilities showed a higher rate of successful attacks
- Those who didn't gather intelligence often ended up wasting their offensive resources by wasting them on firms that already had sufficient defensive resources
- *Artificial agents proved to be better terrorists than humans*

Agents' Behaviors -- Governments

- Governments that had security policies for their region attracted more firms and had higher GDP
- Governments that enforced law aggressively had higher GDP
- Governments that were unfair to foreign firms had declining GDP