



Initiative *for* Policy Dialogue

**IPD/JICA Task Force on Industrial Policy and Transformation  
New York, Feb. 19-20, 2015**

I. Introduction

A meeting of the IPD/JICA Task Force took place at Columbia University on 19-20 February 2015. This report summarizes the major issues of the meeting. In doing so, it broadly follows the spirit of Chatham House Rules, in reporting on the discussions: we are careful in attributing particular ideas to particular people, except for those in the public domain and those deemed to be not sensitive. . Where views are attributed, it should be noted that they are personal and do not necessarily reflect those of any institution.

The purpose of the meeting was to follow up on the IPD/JICA Task Force Meeting on Industrial Policy and Transformation in Jordan (June 5-6, 2014). The presentations and discussions covered a variety of topics over the 1.5 days but the main focus was on industrial and transformation policies.

IPD once again thanks the Japanese International Cooperation Agency for their support. Our gratitude is not only for JICA's financial but also substantive support both in the forms of papers presented at the meeting and active participation in the discussions.

II. Opening Remarks

*a. Joseph Stiglitz*

To commence the symposium, the moderator gave an overview of where the study of industrial policy (IP) lies today. According to Stiglitz, whereas at one time IP was an important focus of policy, in recent history it has been experienced a “dark period,” and as a result, IP has waned and the economies of developing countries, specifically in Africa, have been left further behind than they would have been. Whereas a number of former developing countries, particularly in East Asia, have been able to implement policies that have moved them into the ranks of the world's leading economies, many more developing countries have failed to “catch-up” or even diverged.. For countries seeking development, based we need to look at he lessons of successful development ,to se what can be done and how can it be done ? How can we adapt what we have seen in East Asia, and use the core ideas behind IP, and implement them in countries with different institutions and cultures?

The Task Force Meeting in Jordan focused on learning and innovation in IP. During this meeting at Columbia we aim to retain that focus; also old topics would be revisited from a new perspective, such as finance and development banks (What makes for a successful development bank? What about failures? Why have development banks been in decline and how can we

revive them?). The future agenda also focuses on new topics in industrial policy, such as climate change, and inequality.

IP is not just about correcting market failure, but also guiding the market. In studying IP, we can ask, “How can markets work in effective ways? How can we learn from market failures? What about market failures that result in too few jobs, inequality, and climate change/environmental issues? In the last ten years there have been new advances in the methodology of focusing on overcoming market failures and inadequacies.. We have moved beyond the focus on “picking winners,” Today there have been important methodological advances in thinking about spillovers and externalities from a learning perspective. and what that means for development.

For example, JICA has a lot of experience on the ground and has implemented these ideas in practice, such as in Ethiopia and Brazil. JICA goes beyond the theoretical IP ideas and “puts its money where its mouth is” to implement them.

*b. Ichiro Tambo*

Mr. Tambo pointed out that IPD and JICA have a long history of collaboration that dates back to 2008 and that he looks forward to its continuation. Also, there will be a conference on African development next year – TICAD – and as was the case for the last such conference, JICA hopes to collaborate with IPD in focusing on issue of the quality of growth and ideas for African leaders to look forward to and aspire to.

*c. Akbar Noman*

Noman then provided a review of the rich discussion held at the Jordan meeting. Adding to what Stiglitz mentioned earlier about the dark period of IP, Noman pointed out that many institutions such as the World Bank have downsized or closed their industry departments and have ended their financing of development banks. He focused on the highlights of the Jordan meeting, especially the contributions of those who were unable to attend this meeting. In particular he noted the following:

- Joe Stiglitz’s presentation on learning and its implications for IP. Closing the knowledge gap is essential for economic transformation; more so than the efficient allocation or even accumulation of resources. the focus on static allocation so central to the Washington Consensus (WC) is misguided,. Central question for development policy should be what Governments can do to promote learning. Differences between sectors in earning intensities, spillovers and externalities provide the rationale for IP.
- Issues of static vs. dynamic efficiency/comparative advantage arose at several points. Particularly lively debate between Justin Lin and HA-Joon Chang with the former emphasizing a “latent comparative advantage” and Vhng arguing for that there was also a case for taking leaps. ‘
- Chang and Wade spoke on the developmental state. Upshot: there are different types and degrees of development states One should not seek perfection but “good enough” institutional solutions can go a long way.

- It is a myth that other developing countries, particularly in Africa, cannot develop like the East Asian countries because they do not have the bureaucracy and technocratic government that can be seen in East Asia.
- *Not* having industrial policy also carries risks and costs.
- It corruption and institutional failures are by no means confined to industrial policy. Liberalization and privatization policies, indeed all policies are vulnerable to capture and rent seeking
- There has been a neglect of development finance institutions.
- Scandinavia provides lessons to be learned. They have high taxes, low differences in wages, and strong unions. In Scandinavia, to address inequality, they compress wages at the top and bottom and higher profits from this compression are used to invest in technology which improves productivity without reducing employment. This demonstrates that policies that promote equality can not only complement but also support IP
- Other issues discussed in Jordan but not on the agenda of this meeting included those pertaining to social capital (Go Shimada); the Africa Transformation Report (Yaw Ansu); and natural resource-led growth (Perez)

### III. Robert Wade, “Climate Change and Industrial Policy”

At the outset, the speaker addressed the relation between climate change and industrial policy. Climate change will constrain everything we think about and the transformation could be much greater than what Karl Polanyi had suggested in 1944. However, there is an opportunity for “green” growth and shift towards a techno-ecological paradigm. IP can play an important role in promoting investment in technologies to address climate change. The response to climate change requires an end of the dominance of the neo-liberal market policies. .

Wade then turned to the scientific evidence of climate change and then focused on policy reform, using the UK Climate Change Act (CCA) as a case study. Today, carbon dioxide concentrations have reached over 400 ppm, a shocking number when you consider that in the last 800,000 years, the atmosphere has not gone above 300 ppm. Additionally, the rate of growth of carbon concentrations is increasing at an increasing rate. Furthermore, Wade pointed out several counter-arguments of climate change skeptics, such as that ice melting and growth is cyclical in nature or that global warming is moving in a pattern that suggests the rate is not abnormal. However, Wade demonstrated how these are unfounded and have been disproved.

Besides those that are skeptical that climate change needs to be addressed, Wade points out that there is a belief that economic growth is impossible without increasing greenhouse gas emissions. Additionally, policy makers and the public are unwilling to make changes in emissions because it is believed to be too costly, however if we wait too long the repercussions may be of an even greater cost.

Based on Peretz's theory that there have been 5 economic periods propelled by fossil fuels and followed by either a crash or by government regulation, Wade ascertains that this is an opportunity for governments to act. In order to think about how governments should act, it is important to assess current actions governments have taken, and as such Wade looks at the CCA which has had unprecedented support but has not proven to be a durable solution. The CCA intended to inspire confidence in investors by binding the current and future governments to specific targets; however, because the government's commitment to its own targets is now uncertain and because of government infighting, investor confidence is waning (in fact, more people are investing in non-renewable energy now than renewable energy).

### *Discussion*

- People may not want to invest 1% of GDP in renewable energy or the green economy, it has been argued that if you have multiple equilibria maybe you can even gain from the investment (commenter notes that this is not necessarily convincing but does indicate some opportunity)
- In response to climate change skeptics who claim that there are many causes to greenhouse gas emissions and that it's not just caused by people: We have to work with what we have; even if there are external factors contributing to carbon emissions we need to work on what *we* can change.
- There is also a problem that in some countries the public is supportive of climate change policy and reform, however politics often gets in the way and there is paralysis for reform.
- The example of Japan: the carbon tax never became popular discussion and it never took off on popular scale.
- Countries can put pressure on other countries to make reform with border adjustments. For example, a government can impose tax on other government imports if they don't impose their own taxes (ie: if you don't impose the tax, we'll take what you would have gained from it). In the Shrimp Turtle Case the court found it is ok for countries to impose environmental taxes but has to be in non-discriminatory manner (though this needs to be the least trade restrictive and the case is a bit contentious).
- Governments and the public will not act until they see the effect in their daily lives.

## IV. Development Finance in Asia

*a. Go Shimada, "Inside the Black Box of Japan's Institutions for Industrial Policy - An Institutional Analysis of Development Bank, Private Sector and Labor"*

Shimada focused on the success of development banks in Japan as a case study for effective and ineffective development bank implementation and practice. According to a 1993 World Bank report which reflected on Japan's success in development, "[Rapid growth economies such as Japan, Korea, Taiwan and China] *had competent and insulated bureaucracies and banks to select and monitor projects, and each applied export performance as the main yardstick for credit allocation ... Few developing economies today have the institutional resources to consistently impose performance based criteria for credit allocation*" (italics inserted by speaker). Institutions

allow for a stronger network, long-term transactions, trust, and positive externalities and address market failures and risk, thus reducing uncertainty and production costs. Five key elements that lead to the success of the Japan Development Bank (JDB) were:

1. Autonomy of the JDB
2. High appraisal capacity of the JDB
3. Complementarity among sectors (Horizontal and Vertical)
4. Inclusive and Decentralized PPP
5. Labor-Management relationship

The origins of the JDB lie in the Reconstruction Finance Bank (RFB, established in 1947). This bank had a policy focus on increasing production (specifically, 70% of RFB finances went to the coal industry) and was directly tied to the government. However, the RFB was dismantled after a bribery scandal in 1948 (known as the Showa Denko Scandal), which demonstrated the negative influence politics was having on the development bank. As a result, the autonomous Japan Development Bank (JDB) was formed in 1951.

Due to the scandal, the JDB was given autonomy from the national government and had a self-finance principle. The government's five-year plan was seen as a "guiding principle" on overall JDB policy, however the JDB had the final say on its own financial policies. Because of this principle, the JDB needed to show that it had high appraisal capacity. One way of doing this was keeping many junior staff from the RFB but firing senior management and replacing them with senior staff from other banks, such as the Bank of Japan, Hypothec Bank, and the Industrial Bank of Japan. This allowed the JDB to utilize the knowledge and experiences of staff members from the RFB while also responding to the scandal. Additionally, the JDB had a low default record (0.01%) and the JDB's loan decision was considered to be reliable and unbiased. As a result, the JDB became a signal for private banks and companies to begin investing as a result of the lower risk of providing a loan.

The JDB was part of Japan's industrial policy and as a result, the complementarity of horizontal and vertical spillover was beneficial to both the industrial sectors (horizontal spillover; such as iron, coal, ship building, electricity, and infrastructure) as well as SMEs (vertical spillover). Furthermore, another complementarity piece was that the JDB provided a transition to private banks and intended on stepping aside to give an opportunity for private banks to succeed. (At this moment in the presentation, there is some discussion on why it should be a concern that a development bank might crowd out private banks. One person points out that having private banks to take on general banking and a government bank to take on higher-risk development projects might be beneficial. Someone else points out a liquidity issue.)

The fourth key to the JDB's success was its inclusive and decentralized PPP. PPP's nature changed from exclusive (government, conglomerate) to inclusive (ministry bureau, deliberate council). As a result, prior to the JDB, 25,000 tons of steel would be difficult to transport. The JDB allowed for investment in infrastructure and coordination between the steel and shipping industries and thus steel became a competitive industry that then resulted in an increase in the competitiveness of the machinery industry.

Finally, a fifth key element was the labor and management relationship. After WWII, Japan transitioned to a non-autocratic and non-military nation. During this transition, a policy resulted in the dissolution of the conglomerate (which was believed to support Japan's militarism), promotion of SMEs, and support of a labor movement. In 1946, there was a strike of over 300,000 workers around Japan. The US provided aid in assisting labor and management relations from 1955-1961, in particular by inviting nearly 4,000 Japanese to visit US factories). The Japan Productivity Center, which received aid from the US issued the guiding principles of expanding employment, improving cooperation between labor and management, and implementing fair distribution of the fruits of productivity.

Though it is impossible to guarantee success by exactly replicating the JDB in other context, these five principles could be applied to development banks elsewhere. Fundamental factors of the JDB that should also be considered when implementing DBs is autonomy and a strong network inside the institution that reduces transaction costs, shares risk, clearly divides labor (an "exit policy") and aspires to shared prosperity. In conclusion, in order to strengthen institutions, it is necessary to utilize the context of the country and the institution.

### *Discussion*

When the speaker explained that the JDB was able to step aside and let the private banks begin to move in, Stiglitz commented that the JDB did not crowd out the private banks but rather allowed them to "crowd in." Someone else commented that the government is responsible for only high-risk projects. There was also mention of a liquidity problem.

Another comment was that there are lessons here that could very much be used for development banks and connecting IP and that this is not necessarily a new idea. It was also found interesting that the JDB could not respond to economic environment because it was "locked in." There is a suggestion of comparing the development bank then and now.

#### *b. Deepak Nayyar, "The Indian Experience and its Lessons"*

This speaker focused on the Indian experience and the decline of the development bank in India and addressed what were the factors of this decline and what are the lessons we can learn. For two decades, development banks in India were the most important source of finance, but the importance declined in the 1990s and then rapidly declined in the 2000s. The public sector relies on development institutions; without these institutions, the necessary levels of investment would be difficult to finance. India's culture of development banks is unique in that it has a wide range of development institutions. Some interesting characteristics of the many different kinds of development banks in India were:

- The method of transforming savings by household to investments by firms (interestingly, the importance of this kind of saving increased in the 1990s and then more so in 2000, at the same time that other institutions were diminishing)
- Other financial institutions did not just play a financial role but also were seen as leaders in communities and had significant, sector-specific impact.
- Distribution of disbursement by national term lending institutions was *not* connected to IP at either meso- or micro-levels at any time (even on pharma sector, which might have seemed like an obvious choice)
- Allocation of resources were shaped by borrowers rather than by lenders

- The process of due diligence of loans was limited and the capacity of borrowers afterwards was not assessed; the role was that of “silent partners” promoting the status quo rather than interest of minority shareholders

In terms of lessons learned, on a basic level the development banks of India showed that development finance is essential to kick-start the process of development. Additionally, the diversity of institutions and the devolution to state-level institutions fostered geographic spread, provided access to small-scale institutions, forced industries to focus on SMEs, and provided finance for sectors where it might not have been adequate. However, development institutions did not specifically lend for infrastructure until later (which was too little too late and a big mistake). Often, the DBs provided finance for sectors that might not have been adequate or a useful complement. Furthermore, there was the absence of lending focused at IP priorities—strategic selection in industries such as pharmaceuticals could have and would have been feasible and desirable.

While the DBs counterparts in some countries such as Brazil flourish, there has been a winding down and closure of DBs in India. The DBs in India provided a means for industrialization but were not specifically industrial *policy* and therefore could not be compared to more successful DBs, such as that of Japan. India’s DBs lacked incentives and disincentives that would have penalized failure as well as an institutionalized system of checks and balances to reduce collusion between the government/DBs and firms. These structural flaws were in the design of the Indian DBs, making it extremely difficult to adjust and respond to failure.

In other parts of the developing world, there were strong similarities between DBs when they began around the 1950s. They had similar patterns of lending and almost all (such as those in Latin America and Asia) lent primarily to infrastructure (until 1980, when they began to lend more to manufacturing). They also had similar sources of finances, such as, concessional funds by governments. Although the patterns are different between each DB, the similarities on the whole are striking. Often, DBs had a common purpose and multiple functions:

1. Make key advances in infrastructure to kickstart industrialization
2. Invest in ways that private sector will not or cannot do
3. Allocate scarce resources to select industries/firms at a meso- or micro-level

The decline of the Indian DB was in part a consequence of government withdrawal of finances and a maturing of domestic capital markets. Comparatively, the state of DBs in developing countries varies greatly, varying from significant decline to slow decline to growth. For example, in Mexico, Turkey, and Thailand, DBs are in significant decline, though not as bad as in India. In Korea there has been marginal decline. Brazil and China have seen increases in the macro number of DBs from 2000-2010 (though China only began implementing DBs in 1994). One reason why Brazil and China have done better in development is the strengthening of DBs, especially when compared to other countries that have diminished their DBs.

### *Discussion*

- In comparing India’s development banks with other nations: IP support from DBs at micro level of the sort that happened in Japan & Korea—about picking champions & picking winners, would not succeed in India because we did not have the mechanisms but would have worked at meso-level if you had selected sectors to finance

- It was clear that the pharmaceutical sector would have been prime candidate—yet that is not what happened. Also: textiles-- clothing would have been good but now Bangladesh and China have double the exports of India.
- At a macro-level, you could think of large countries that focus on import substitution whereas in smaller countries exports were at the beginning rather than the end of markets
- More on DBs in India: They had a wide range of institutions and some that did better while others did badly—many did worse! Performance was bad because there was not enough incentive. However, there were also good financial institutions that had some flexibility. They were not as nimble as Japanese institutions, but they definitely had flexibility... At the end of the day, why DBs vanished in a short span of 5 years was largely ideological—an ideology which began with smaller institutions and internalized into decision-making institutions (such as the ministry of finance and the Reserve Bank of India). The RBI said, “The time for these institutions has passed. Shut them down or turn them into private banks.”

*c. C.P. Chandrashekar, “Development Banks: Managing Moral Hazards and Mobilizing Resources: South and South-East Asian Experiences”*

According to the presenter, there are two kinds of development banks: those that are geared towards providing long-term finance for development and those mandated to provide credit to specifically targeted clients like agriculturists or SMEs, to render development more inclusive. The latter, having “an explicit legal mandate to reach socioeconomic goals in a region, sector or particular market segment,” are more like specialized policy banks.

Gerschenkron understood that development banks (DBs) play a role in the absence of capital or the availability of adequate entrepreneurial skills or technological expertise. But we still do not understand how these institutions emerged or were created. Piero Sraffa emphasized finance as instruments of state policy and addressed the issue of liquidity mismatch.

Some of the first DBs were the German Kreditbanken (also referred to as Grossbanken or the German universal bank) and the French Credit Mobilier (CM). According to Sraffa, CM had a wise policy of matching maturities of assets and liability but turned towards financing long-term investment with short-term deposits, leading to its failure. CM did not receive adequate support from the state and faced competition with Banque de France (which jettisoned CM’s requests for government permission to issue long term bonds). Furthermore, CM had a liquidity problem as a result of assets held in the form of securities associated with long-term credits that were not easily substituted with cash to meet the demands to pay back depositors (not, as is often believed, because banks would not be able to call in these long-term credits).

The German Kreditbanken was based on the CM experience and thus, to address the liquidity problem, the Kreditbanken had the backing of the German central bank (the Reichsbank). The Reichsbank’s role in the German economy was that of “planning office” and involved the central coordination of investment allocation. This was possible due to the elasticity of its note issues (unlike the Bank of England, which is tied to the Bank Act’s rigid note issue).

In order to address the moral hazard problem, the German Kreditbanken had long-term, nominated directors on the board to monitor managers (on behalf of itself and other stakeholders,

which gave significant knowledge of firms), was often part of the decision-making process, and dealt adequately with the information asymmetry problem.

Development finance institutions (DFIs) are important because it is not certain that institutional substitution that can support late industrialization will evolve naturally and modern commercial banks have a tendency to fail in these situations. The government backing of banks provides the guaranteed financial support for borrowing/investment. A World Bank survey in 2009 of 90 DFIs found that 74% were entirely government owned and 95% were mostly or entirely government owned. Most of these institutions (41%) were not primarily deposit-taking institutions—they were borrowing, generally, from their central bank (89% were borrowing from other financial institutions/issuing debt in local markets, 40% obtained budgetary transfers from the government, 64% benefited from government guarantees of the debt they issued). Most (49%) were established from 1946-1989 (12% pre-1946 and 39% post-1990).

A look at 3 cases: South Korea, China, and Thailand. South Korea's Korean Development Bank (KDB, established in 1954) was primarily focused on granting medium- and long-term loans to industry. Among the factors responsible for Korea's success, with its outward-oriented and mercantilist industrialization strategy based on rapid acquisition of larger shares in segments of the world market for manufactures, was the role of the state in guiding industry to the segments of the global market that were seen as best targeted. For this to work, the State through its financial policies ensured an adequate flow of credit at favorable interest rates to firms investing in these sectors, so that they could not only make investments in frontline technologies and internationally competitive scales of production, but also have the means to sustain themselves during the long period when they acquire and expand market share.

The China Development Bank (CDB) was established in 1994 and issued bonds that were subscribed to by banks in order to mobilize resources. CDB lent to many local governments and financed huge infrastructural investments.

In Thailand, there was late industrialization with mostly social policy institutions and loans for the most part were small. Most DFIs were specialized financial institutions (SFIs), owned by the government and geared largely to providing credit to sectors excluded from access to commercial bank advances. Some SFIs were deposit-taking while others relied on the issuance of debt. SFIs are exempt from profit and other taxes and receive government guarantees on the debt instruments they issue. After the financial crisis, SFIs stepped in to make up for the collapse in credit from commercial banks (from 7% of all financial assets in 1996 to 14% by 2007). As a result of restructuring, there was an increasing focus on policy lending by SFIs..

In conclusion, over a significantly long period of time, countries embarking on a process of development within the framework of a mixed, market-driven economy have used the developing banking function as an important instrument of industrial policy. With financial liberalization transforming financial structures, some countries are doing away with them on the grounds that equity and bond markets would do the job.. This is bound to have adverse implications for industrial development.

*Discussion*

- Do not think of modern banking as part of the original concept of banking—when people aren't spending all of their income, there is a deficiency in aggregate demand; today people can spend and spend more than their income
- Behind all banks today is a government guarantee, which has nothing to do with an intermediation role— thus all banks are, in a sense, “state” institutions. We have delegated the right to use the credibility of state to private banks in order to make money (and to abuse people). In context of DBs, what we used was that power to grant that right to DBs to do it for development purposes. It is all within the power of the state and just a reflection of how the state delegates this power. It is just a myth that we have created is otherwise. An excessively liberalized financial sector can be destructive—as demonstrated by the crisis that broke out in 2008.
- The role of the state is essential, and we need an appropriate macro-setting.

## V. Industrial Policies Old and New: Varieties and Considerations

### *a. Akio Hosono, “Industry: Towards a Learning Society for Inclusive and Sustainable Development”*

There is a growing recognition of the critical importance of learning and innovation for growth and development. For example, APEC's growth strategy (2010) highlighted the importance of inclusive, sustainable, and innovative growth; the Summer Davos meeting (2011) focused on “mastering quality growth” and highlighted innovation; and Stiglitz & Greenwald's recent book *Creating a Learning Society: A New Approach to Growth, Development, and Social Progress* (2014) also focused on this topic. We need to examine and search for the insights into effective approaches to creating a learning society.

In January 2015, Japan announced the “Development Cooperation Charter” to replace the “Official Development Assistance (ODA) Charter,” focusing on “high quality growth” and “poverty reduction through this growth,” in which inclusiveness, sustainability and resilience are stressed.

In the Framework of Inclusive Growth Indicators (FIGI), there are three pillars that are built on the foundation of good governance and institutions and can deal with issues of poverty and inequality. The three pillars are: (1) growth and expansion of economic opportunity, (2) social inclusion (to ensure equal access to economic opportunity), and (3) safety nets. The first two pillars are intrinsically related and important to inclusive growth and innovation.

Three effective approaches/strategies for inclusive and innovating growth are:

1. Industrial strategy for transformation of industrial structure, creating new industries, diversifying industries, deepening of value chains and clusters, and so on and for enhancement of skill and capabilities of human resources to respond to the opportunities created by transformation process led by leading industries: Pillars 1 and 2
2. Taking full advantages of externalities of leading industries of transformation: Pillars 1 and 2
3. Continuous efforts to strengthen preparedness of workers, farmers and others to participate in transformation, improving their capabilities and skills and at the same time self-discovering opportunities, through “capacity development”, “One Village One Product (OVOP)”, “Kaizen”/TQM/JIT, and other initiatives: Pillars 2 and 1

Generally, inclusive growth implies that all people participate in and benefit from growth. However, from “a learning society” perspective, inclusive growth goes far beyond these aspects to combine innovation with growth. Growth could be really inclusive, and at the same time innovative, if the growth takes the full advantage of talents of all.

Based on the two main pillars, there can be three approaches: either emphasize pillar one, or emphasize pillar two, or equally emphasize both pillars. In a paper written by the speaker (2015), he analyzed six particularly strong cases of industrial development and transformation: “Thailand’s automobile industry”, “Bangladesh’s garment industry”, “Tanzania’s rice production”, “Kenya’s agroforestry in semi-arid areas”, “Brazil’s Cerrado agriculture and agroindustry development”, and “Chile’s aqua-culture of salmon and shellfish”. From these examples we see that learning and the accumulation of knowledge and capabilities are essential for the process. In all of these cases, capacity development of individuals and organizations involved in the process was the key to maximizing opportunities created by the process. It was for this purpose that the respective governments facilitated the capacity development. In most of cases, effective institutions accomplished the role of facilitator.

Capacity development (CD) is a dynamic process and one of the most important approaches for Japan’s Development Cooperation. In the process of CD, there is support by external actors that act as drivers towards development. Additionally, there is stakeholder ownership and mutual learning among stakeholders. Finally, 8 cases of CD are analyzed: SHEP and SHEP UP in Kenya; Local Government Engineering Department of Bangladesh; Fishery and Aquaculture Development Center of El Salvador; Seikatsu Kaizen programs in Japan and developing countries; OVOP initiatives; Just in Times and Total Quality Management; agro-forestry to cope with climate change; and resilience against natural disasters. These cases demonstrated different successful examples in which innovation was a key part of growth.

*b. Antonio Andreoni, “Varieties of Industrial Policies”*

This talk was an updated version from Jordan meeting and 3 points were discussed:

1. Problems of understanding industrial policy: more focused on industrial policy package.
2. Importance of institutional setting
3. Need to understand political economies of policies.

Where does the variety come from? It comes from cyclical changes and durability. We are moving from the understanding of IP as a single institution to more of a focus on IP packages, both in time and overtime.

An outline of the discussion is as follows:

1. Recognising the **variety** of industrial policy experiences and its origins
2. Mapping industrial **policy models and packages** and their cyclical changes, beyond discreet policy intervention analyses
3. Focusing on emerging **focal policy domains and policy linkages**

4. Assessing both the **quantum** (size) *and quality* (engineering content and alignment to emerging manufacturing system's needs) of policies

4 factors that are responsible for countries' IP variety are the following:

1. Structural transformation (different countries have different transformation patterns)
2. Institutional settings and policy models (can change even when we talk about same institution)
3. Political settlements and political economy issues (this was not covered for lack of time)
4. Industrial policy discourse (policy makers and academia and changing policy space)

To what extent have countries been able to move from transformation cycles to the next cycle? Policy models have top-bottom, bottom-top, or a mix of these. We need to look at policy content. One example is Germany. The analysis is informed by engineers.

Innovation dynamics are becoming cross-sectoral. Industrial Policy: manufacturing system changes dramatically. We see how industries are vertically integrated. This has implications for industrial policy. We have packages of interactive measures.

Mapping different policy measures on both demand and supply side. We have different policy action and different policy models. It is important to think in terms of a policy package because single policy measures depend on their linkage with other policy measures.

There is multi-layer policy model. US, Germany, Japan has lots of manufacturing system support. They are targeting technology platform. This is a new way of introducing selection. We have new understanding of production capabilities to support technological infrastructure. For example, China and Brazil are models of technological infrastructure growth.

Financial infrastructure: There were lots of discussions about development banks. They are not simply giving money; they have public procurement & conditional procurement.

*c. Ming Leong Kuan, "Analyzing the New Global Input-Output Data: Linkages Between Manufacturing and Services Are Closer Than You Think"*

The main research question of this presentation was: Do manufacturing and services go together in one country? What is the merit of the view that these have grown increasingly apart? The world input-output database released by the European Commission in May 2012 was used to answer these related questions. This database covers the years from 1995 to 2011 and 40 countries.

There are supposedly two opposing forces have altered the services content in manufacturing: Offshoring and outsourcing (or 'splintering'; Bhagwati, 1984) of previously-integrated services, and the 'servitisation of manufacturing' to enhance their competitiveness (Vandermerwe & Rada, 1988).

It There are 6 selected findings from using the data set mentioned above:

1. Manufacturing and services continue to have a strong propensity to co-locate with each other

- a. 86-91% of intermediate services are still co-located in manufacturing
2. Manufacturing-services linkages differ across industries
3. Intermediate services exports offer some potential, but it still remain small for now.
4. Deindustrializing advanced economies are losing domestic intermediate services demand, without being adequately compensated by exports to industrializing developing countries.
5. For deindustrializing countries, business services offer healthy potential for export. Financial Services have not played a catalytic role in intermediate services exports.
6. Manufacturing production is shifting to the East. Intermediate services are following closely behind

Overall, we see that manufacturing and services remain strongly co-located and they are highly heterogeneous. In conclusion, it is asked, “Will the loss of manufacturing and intermediate services (to manufacturing) be compensated by the growth of services to non-manufacturing activities?”

*d. William Johnson, “Technological Spillovers and Economic Growth: Evidence from US Industrial Clusters”*

The hypothesis of this paper was that not all industries are created equal and the flow of resources into the right industries are not automatic, hence we have market failures. This explains, in part, national differences in income and growth. Further research can help to correct these market failures.

The challenge in answering this is how to identify better or worse industries. In economics, we think of the network of industries. What is the implication for aggregate growth? One specializes towards the center of the network.

This idea is different from Albert Hirschman. Take the oil industry, for example. Every other industries use oil, and according to Hirschman framework that may imply that oil is the center of the network. But Hiddago et al shows that oil industry is not really related as it doesn't really spillover to any other industries. It builds on product space.

The speaker built a quantifiable model and tested it empirically.. When analyzing the closed economy, there are a number of industries and occupations. For example, suppose there is a shock to automobile industry. Then there is learning-by-doing by engineers, and hence positive spillover (such as in the airplane industry), but not really to the financial industry. That is, there is no link between the finance and automobile industry according to this model.

However, there exists learning by doing. The speaker uses the Leontief function for production function. The essence of the model captures how similar sample industries “I” and “J” are. If they are more similar, there will be more spillover. The model captures this by using effective labor force.

Q term is endogenous, and the shock on the automobile industry would move along learning-by-doing, and change the whole structure of the network. Then the model quickly becomes mathematically intractable. So here, structure of network is fixed and not change over time.

By using the U.S. data, it is possible to show that the model performs better than null model. Null model is where there is no learning-by-doing. Additionally, the speaker employed the Ricardian model and the Costinot et al (2012) models of trade.

Combining these purely trade models with the growth model (which is without trade) and you have a model with the the following features:

1. Countries trading with each other are subject to trade costs
2. Utility functions and production functions are the same across countries
3. Productivity varies at country\*industry level
4. Learning spillovers are only within countries, not across countries implying a dynamic evolution of comparative advantage

We see that learning spillovers are important. And this is a valuable lens . to view the dynamics of comparative advantage. In work planned for the future, the international trade data will be incorporated into the model.

### *Discussion*

- **To Akio Hosono:** One dimension to consider is macro-economic instability, and limits to capacity. How do people compare learning abilities?
- **To Antonio Andreoni:** Structure of industrial policy in the face of aggregate demand constraints. . There is a framework of industrial policy without global demand constraints. Using it could be a bad basis for industrial policy. The idea is that if demand for manufacturing is fixed, then it can't be that everyone exports manufacturing goods. People are unaware of global constraints. For small countries and products it may not matter but for manufacturing as a whole and many countries it does..
- **To Ming Leong Kuan:** First point is about the linkage between services. Linkage could go the other way. For example, Japan has a lot of people and there are manufacturing capacities in Japan. They have the ability to translate medical services into hardware, and then export the hardware. . Sometimes we can convert services to manufacturing goods. For example, we can convert some of the services provided by medical professionals into machines that do the same. . Second point is on definitions and concepts of input-output. What you call services in dataset depends on the level of vertical integration. so depends on how sensitive to vertical integration is the disjunction between services and manufacturing. .
- **To William Johnson:** First point is that when we look at the data, if we have chemical engineering rather than engineering, spillover will be very limited. Broad definition is not that obvious. Second point is that Hausman's earlier point is that linkages are actually endogenous. For example, diamond mining industries need to detect whether people steal diamonds. Hence one develops a radiation system that can also be applied to a whole range of activities. Wouldn't show up in data or Hausman data, but it is important. Third point on this is that we need to think about differentiated products. Most of trade is not

related to comparative advantages, but is in differentiated products. Examples include trade between the US and Germany.

- **Antonio Andreoni:** We have different regimes and different capacities, and all countries try to capture manufacturing..
- **Ming Leong Kuan:** Vertical disintegration means that the previous integrated services within manufacturing were counted as manufacturing output.
- **C.P. Chandrashekar:** First, the distinction between services that are tradable and non-tradable is important. .
- Response: In terms of intermediate output tradable services are still small.
- **T William Johnson:** We have trade interdependence in addition to technological interdependence and the resulting interactions and dynamics are difficult to capture in the sort of models you are employing.
- One general comment: where does Industrial policy stop? We need broad industrial policy. There is a capacity to adopt. Understanding stage of development of country, and issue about the capacity constrained is important.

About the East Asian Miracle study : the World Bank and Japan had issues on industrial policy. World Bank protested that Japan was undermining financial sector reforms by supporting development finance so Japan put a large amount of money on the table, and asked for a study of the lessons of East Asian success with development finance and industrial policies, more generally. This put World Bank management in difficult position. So if one looks at the East Asia Miracle Report (1993), it is full of tensions and contradictions resulting from trying to square the evidence with its ideology. For example, the study says Industrial Policy cannot work, however financial market interventions and development finance, which are part of industrial policy, can work.

## VI. Jose Antonio Ocampo, “Structural Dynamics and Economic Growth in Developing Countries

Underlying rationale for targeted/deliberate industrial policy is the conflict between static efficiency (resource allocation) and dynamic efficiency (changes in the structure of production). The idea is that dynamic efficiency and structural change is the essence of economic growth/development. This contrasts with the “balloon theories of growth” that neglect structure.

The frustrating outcome on economic growth in Latin America reflects liberalizing market reforms that neglected that consideration. . Latin America has grown at a rate of 3% in the Washington Consensus era down from 5.5% in the preceding 3- decades or so.

There are three “Stylized Fact”:

1. *The persistence of large inter-country inequalities.* This is the world economic hierarchy in which entering the “top club” of countries is difficult. Instead of convergence we have had “dual divergence” or “truncated convergence” where economies converge for a

period and then diverge. Additionally, in “dual divergence” there is a divergence among developed and developing economies as well as between developing economies .

2. *Structural change is the essence of economic growth.* Structural change will allow for countries to engage in dynamic activities and innovation.
3. *Path dependence associated with learning processes.* This has to do with dynamic economies of scale associated with learning. (If you leave a sector then you lose that productive experience and you may have *destructive creation*.)

Specialization patterns matter as entry costs are very different across industries in developing countries. The fallacy of the composition means lowering prices of exports that many countries simultaneously try to push at the same time into stagnant markets. . Most developing countries that have grown well have entered into middle-type manufacturers. Though there have been successes in Latin America in manufacturing, most success is from entering mid-level technology industries.

There is plenty of evidence that specialization patterns matter a great deal for economic and export dynamism. , Innovations do not have to be new technologies, they just need to be new for that country or economy .

In development, groups of firms or sectors matter more than individual firms. Thus, with complementarities we have a development of networks of suppliers of goods and specialized services, marketing channels and organizations and institutions that disseminate information and provide coordination among agents. The demand effect is on macroeconomic multipliers and the supply effect is on positive externalities (the basis of mesoeconomic dynamic economies of scale that determine competitiveness of production activities).

In Latin America, as everywhere, there has been both creative and destructive destruction. was destroyed than was created in some respects to the development process. In innovation it is possible in developing countries to have adaptations to local circumstances that provide a competitive edge on the technological frontier, , however it is fairly rare. China’s development of solar panels is an example.

Table of typology of growth processes showing the mixture of strong or weak learning with strong or weak complementarities. In structural transformation policies, you have structural economic systems that are “framework conditions”—you cannot have dynamic growth without those conditions. In principle, infrastructure and education are essential. One can diversify the export base with little linkages and learning with DFI as happened in Mexico. Different markets provide different opportunities, such as north-south, south-south trade.

An anchored industry is when you develop complementarities and the economic space is anchored. For example, in agro-industries, it is not just about innovation but also complementarities. Unless the industries are firmly “anchored” in the domestic economy, their growth-enhancing capacity evaporates and they represent “shallow” specialization. .

Final policy implication/conclusions were:

- Combine strategies of structural transformation with appropriate macroeconomic conditions and (real) stability
- Strategy of diversification of the production structure: mix of horizontal and selective policies + reciprocal control mechanisms
- Structural transformation is not a once and for all process
- It is not smooth (destruction is a companion of creation)
- Structural heterogeneity is a persistent feature

### *Discussion*

- I agree that the structural change drives economic growth, but does causation run in both directions?
- Natural resources activities can also need of a lot of structural change. Chile's rapid growth includes this form of structural change. Chile developed the capacity to become a significant presence the world market for salmon and wine, which was based on innovation. A similar example is in Peru, where there was growth based on natural resources. Both Chile and Peru have run out of growth momentum though. Maybe natural resources give you opportunities but not for long periods.
- Another example: how Indonesia is now in using its natural resources.
- In the case of India, you can have certain sectors that have great complementarity while others are very isolated.
- When were talking about structural change and it implies learning, we have to take into consideration of what stage the country is in. There is an immense space for each country/sector to advance to highest technology industries for example, Japan made a conscious effort to become part of the advanced economy club.
- Mexico is a striking example of having rapid growth of exports but not internal industries. Mexico destroyed much domestic capacity in manufacturing and there is not a lot of manufacturing growth

### VII. Joao Carlos Ferraz, "Development Finance: Brazil and its Lessons"

At the Jordan meeting, there was some focus on uncertainty.. Structural change implies uncertainty. If we do not know the nature of uncertainty, then it is hard to understand the future. As a result, this talk focused on uncertainty and its ties to investment and financing.

In summary, the discussion focused on:

- Development stalemate, or the demand for investment
- 4 different types of uncertainty & how development banks can play a role in minimizing or mitigating them
- Development finance institutions can play a key role because they have the capacity to mitigate and manage uncertainty

Over the last ten years, interest rates have been decreasing and there are increasing sources for investment (as shown by the reduction in firms' debt and increase in liquidity), however sluggish investment from the OECD and China prevails. Furthermore, the net debt of the S&P 500 firms has been decreasing, banks and firms' credit/deposit ratio is decreasing, and investment to the GDP of OECD is also decreasing. As a result, we are in a development stalemate: developed countries are not investing, and developing countries are in great need of investment. Monetary

and fiscal policies are not sufficient to address this issue—“transformational” policies are needed.

As long as we are stuck with current policies they will not lead out of this trend, it is necessary to come out with priorities and adequate institutional frameworks if the way out of crisis is to turn into reality. Transformation demands investment under conditions of uncertainty.

4 types of uncertainties:

1. Complexity of project itself – especially investment associated with technical change, which is often trial and error. Two other components that make life difficult:
  - a. Progress: Convergences of different technical basis to come out for solution to given economic activity
    - i. I.e.: pharmaceutical industry now requires lots of IT, big data, analytics
  - b. Structure: Big innovation, the R&D lab that Thomas Edison induced does not suffice, needs to induce complementarities or networks; and infrastructure associated with given programs
2. Timeframe of the investment: because maturity is so long, changes in relative prices, exchange rate, etc. can put that project in danger.
3. Market economic conditions: Exchange rate, interest rate, volatility
  - a. Example: when you’re calculating an investment, how can you trust a t-10 bond? How do I price my financing or products in the context of economic volatility relative to the environment where you can forecast with a high degree of certainty?
4. Climate change: although this has been on for some time, now it is in the priority agenda.

One important aspect of development banks is their diversity in the number of segments/sectors supported, number of instruments used (number of instruments: providing funds for banks, providing credit, project finance, grants for research institutions, venture capital funds, buy equity, guarantee funds, etc.), and asset size. This scope is very important in order to give flexibility of supporting segments or demands of different segments.

Furthermore, development banks have an anti-cyclical role to play in the economy. For example, during the economic crisis of 2008-2009, the Canadian, Mexican, Brazilian, and Chinese development banks actually increased their credit portfolios in order to step in and respond to the crisis.

Development banks also address time-related uncertainty through long-term financing. For example, from 2007-2013, development banks invested \$509.2 billion in the energy sector. Brazil’s development bank was also investing in energy sectors such as large hydro (97% financing share of BNDES), medium hydro (61%), wind (55%), ethanol (32%), and pulp (89%). All of these projects are long-term and the longest is 30 years.

How are the interest rates for these projects? In Brazil, the long-term interest rate is lower than the short-term interest rate. Since the mid-1980s, the government has put down a long-term

interest rate from time to time, and this funding is based on that. For the past 3 or 4 years, the long-term interest rate has been at 5% and the short term has been about 10%.

Development banks in 2012 invested \$123billion in climate change adaptation or mitigation projects, compared to \$102billion from project developers, \$66billion from corporate actors, \$33billion from households, \$21billion from commercial financial institutions, and \$12 billion from governments. BNDES has been increasing its investments in green projects, from \$3.4billion in 2007 to \$10.9billion in 2013.

In conclusion, transformation implies uncertainties of different types and we must open the black box of uncertainties and understand them better.. If we can understand their natures then we can build an institutional framework for dealing with that. Thus, development banks have a strategic role to play in economics of all stages of development. These banks can function independent of the political sphere and cronyism is to be avoided at all costs. These institutions are operating with public funds and, public funds being the most valuable resource in society, efficiency and effectiveness are all the more important. . Furthermore, stability matters if you are dealing with long-term, not only in terms of funding but also human and technical resources.

Furthermore, flexible competencies are key. It is essential that the capacity of the institution be able to evolve with country or region and the development changes its experiences. Why some institutions get stuck and are unable to make change/develop is still a bit of a mystery; some effort must be made to understand why.

If we should engage in systematic research agenda, understanding economics (ie: market failure, credit rationing, financial repression, etc.) and the political economy (mission-oriented, bureaucratic insulation, etc.) would be essential. Furthermore, what are the roles these institutions should play? Should their roles include patent institutions, co-developing financial markets, contributing to systemic stability, or as policy supporters? Also, what are their relationships with ministries?

### *Discussion*

- Terms like “market failure” are code words for the conventional, neo-classical way of looking at state development banks. It is interesting you would use this word because BNDES has been pushing for an innovative way of thinking about development. Thus, I would have thought you would use a term such as “market creating” or “market steering”
- Response: It is the role of institutions to correct failures. In 2008, lots of Brazilians exported and that’s had a role to play for the banks to correct that failure in that sense, but there *is* that language. Market creating is probably most difficult given the nature of our capital, this is where a lot of work/effort is placed, the effort is to do things that are relatively known
- You’re making a presumption of what is going to happen to the project that will affect profitability. I would think that investment banks would be there to serve as an investment coordinating body to tell individual investors if it is a good investment.
- Response: When there is a bidding, especially on infrastructure, such as in wind or roads, before process begins the bank will send out financial conditions to inform public.
- We have to distinguish between following policy priorities and rent-seeking.

## VIII. Industrial Policies II: Some Other Dimensions

### *a. Nobuya Haraguchi, "Structural Transformation and Manufacturing Opportunities"*

This presentation focused on structural change and the role of manufacturing in the economy; structural change within manufacturing and opportunities for low and high income countries, and the global production network.

Studies by Rodrick (2014) and Ghani & O'Connell (2014) show that manufacturing in the economy is slowing and there has been "de-industrialization," within the context of mature economies, particularly in terms of employment. Additionally, in terms of world manufacturing value added shares, the rate in developing countries is increasing while that of developed countries has decreased. Additionally, developing countries have had higher growth in manufacturing than in GDP for 31 out of 43 years.

However, assessments of the value added share of different economies in textiles, electrical and machinery, and transport equipment sectors show that high- and upper-middle-income economies are having the greatest value added share whereas lower-middle-income economies are having a lesser effect and low-income is having almost no effect. Based on this evidence, it is asserted that manufacturing is becoming less important but it is not so clear if there is a systematic change that makes manufacturing less important. For example, is this due to less technology or consumer preference; OR they are arguing that developing countries have failed to benefit from manufacturing opportunities?

The speaker then shows a series of charts that show the value added to different sectors by developed and developing countries. When looking at the value added by different countries in textiles and transport, not much has changed in low- & lower-middle-income countries, however in upper-middle ones there has been growth.. The actual level of development is affected by differences in factors of production but also country-specific conditions.

When looking at employment and GDP per capita across all countries, major sources of manufacturing growth are assessed. The speaker pointed out that sources for manufacturing growth, such as rubber and plastics, exist even in very low-income countries and show considerable opportunity for growth.

In one graph that compares changes in value added and changes in labor productivity, the speaker's conclusion was that when the industry starts seeing employment decline, it is a "window of opportunity" to shift from one industry to another. When looking at employment rates in developed countries, it appeared in France and Germany that textile industries are decreasing but chemical industries and business services sectors are growing.

Until this point, structural change has been from the viewpoint of countries. Next the speaker assessed the importance of global value added change. The speaker then displayed several maps showing the values added by regions to different industries, showing the structural changes within manufacturing. Sectors specifically focused on were textiles, electrical and machinery, and transport. North America, Europe, and China often hold the largest percent of value added,

with the lowest value add of all three regions combined being 68% (final outputs of textiles and wearing apparel, 2011). Overall, *developing countries depend on global value chains* and they participate more in supplying.

Countries closer to major markets or producing countries tend to add values by buying more intermediates. However, it is not so clear on the implications of technology and long-term growth for developing countries.

*b. Eric Verhoogen, "Organizational Barriers to Technology Adoption: Evidence from Soccer Ball Producers in Pakistan"*

This research project is an ongoing micro project, though it has similar macro-level themes to what was discussed in the symposium. With this research, we hope to answer the questions: Do firms adapt the technology? If not, why not?

Our team invented a new technology for increasing the efficiency of soccer ball production, specifically in Sialkot, Pakistan. Pakistan accounts for 40% of the world production of soccer balls. The industry in Pakistan is well suited for an experiment such as this as they are standardized products produced with a common technology (even large firms use same tools). There are 4 steps involved: artificial leather, cutting, printing, and stitching. During the cutting process, workers use their judgment for cutting traditional soccer ball pentagon and hexagon shapes.

As a result of the cutting process, when pentagon shape are cut there is significant waste because the cutting pattern with the pentagon dies is inefficient. Through mathematics we know that, by using a different patterns, workers who cut the shapes (henceforth referred to as "cutters") can cut the pentagon shapes more efficiently. Through this new process, cost is reduced by about 1%, which accounts for 12.3% of profits. In order to implement the technology in their firms, business owners would recover the fixed costs in 19 days.

The first portion of the experiment was broken up into three groups: one group is given the technology, another is given cash, and another is given nothing. (One group is given cash to ensure that there the different between the first group and the third group is not as a result in an input of capital.) Among the 35 firms that were given the technology, only 5 adopted it. One of the adoption groups was the second largest soccer ball producer in Pakistan. One key difference between this firm and the non-adopters was that the former pays a monthly salary to their cutters, as opposed to paying by piece rate as the other firms do.

When we asked firms why they were not adopting these technologies we found that the most important reason was that cutters were not willing to adopt the technology. The cutters found that the technology was slowing them down. Because nearly all cutters are paid based on the number of pieces they can cut during their shift, this reduction in speed reduced the cutter's earnings for the day. As a result, cutters complained to owners that that was a bad or inefficient technology. Hence, we could see that while the technology was more efficient, managers were primarily responding to their workers' complaints.

As a result, a second experiment was implemented. In one group, workers were directly incentivized to implement the technology (group A), whereas the other groups were given a refresher on the technology but were not given any incentive to continue using the technology. Of the fifteen firms in group A, five firms refused intervention and ten agreed to accept the incentive program (of which, two had already adopted the technology already). Of the eight firms willing to accept the incentive and who had not already adopted the technology, five of them now adopted the technology. As a result, probability of adoption went up by 32%.

From this it has been concluded that there are organizational barriers that prevent adoption of new technologies. From this experiment we have learned that, through a relatively small intervention (in monetary terms), a reasonably large impact was possible.

Two takeaways: (1) Inertia in labor contracts can hinder technological change and (2) workers need to expect to share in gains to adoption in order for adoption to be successful. Externalities of technology need inclusive growth; raising worker inclusiveness could increase productivity.

### *Discussion*

- How could this experiment reflect opportunities for producing higher-quality soccer ball? A key part of the industrial process is the growth and development of a product/industry.
- Response: Here we are discussing pentagons and hexagons, hence there is no higher quality. For our next project, we will subsidize the technology and see whether it affects the input they use as well as their technology choice. Perhaps those who subsidize it will also upgrade the technology.
- Shouldn't we control for other incentives to work harder?
- Response: This paper is not really a test. The crucial thing is that workers and owners are adopting the technology.
- One worry is that the sample size is really small
- Response: We would have treated more firms if we knew this question to start with. We did a small-sample robust-permutation test, but you are right, 35 is small. This is for a very specific sector and it was not obvious to us that we would be able to generalize this to other sectors as well.
- Why did the owners believe the workers (when they said the technology was inefficient) over you (who said it was more efficient)?
- Response: This industry was stable and owners don't incentivize them before. Also, sometimes the feedback from workers is useful for firm owners – it is not always bad.

### *c. Luciano Pietronero, "Complexity and Industrial Policy"*

This presentation sought to measure the "intangible growth potential of economies" with a "bottom-up approach." In economics there needs to be different types of algorithms. We need to ask, what are the optimization criteria? What are the potential or capabilities of a country based on a country's products?

Economists have a plethora of data-- but what does it all mean? When looking at half a dozen charts saying different things about the economy, which is more important? Which of this data is dependent on other data? Are the conclusions simply in eye of the observer?

An algorithm could synthesize this data into one graph and give a full picture. Specifically, fitness (how sturdy the economy is) & GDP (wealth). Fitness could be measured by country data of who produces what, with exports taken as proxy for production and assessing the nature of the product (as opposed to the volume of the good). Developed countries produce both high-level products as well as low-level products, giving them high economic fitness.

Countries with higher levels of fitness will continue to grow their economies. However, if there is low fitness but higher GDP, the situation is more precarious. Thus, the diversification of production (in this case, the level of fitness) weighs more heavily on the future of a nation than the GDP, which is a greater reflection on the complex nature of economies.

This algorithm allows for analysts to see the change over time or the “line”/trajectory of an economy and can give greater opportunity to strategize how an economy should move forward. For example, based on these findings, one can see the “poverty trap” and can quantify at what point nations leave the trap; Then, an economic strategy to industrialize and get out of the “trap” can be crafted..

The study of economics is similar to the study of weather patterns. Thus, this model attempts to digest the data of countries and understand what the potential outcomes for countries might be. Some trajectories have high predictability while others have low predictability. In general, higher levels of fitness reflect higher predictability and low levels of fitness predict lower predictability.

This new method of analyzing data results in new interpretations of what nations are in the “poverty trap,” “middle income trap,” etc. Thus, how certain countries should respond in order to develop further may be different than other interpretations. On the whole, this interpretation encourages nations to focus on diversifying their productivity. It is hoped that a result might be to encourage the development of new products and could be a germination of new ideas and innovation. Additionally, through this algorithm, there may be room for interpreting links between the algorithms of the economy and algorithms of ecology.

*d. Wouter S. Jongbloed, “A Product Space Approach to Some Industrial Policies Before the WTO: The Curious Case of Export Restrictions”*

This topic explored global governance and what it means for international trade regulations (specifically: export restrictions). What should be the approach to government regulation? Economic growth should be interpreted as structural transformation (similar to Ocampo’s hypothesis, as discussed above). Take a focal point, through efficient resource allocation, and focus on the dynamic parts of it. Steady state growth, with network and product proximity, is important to this process. Similarly, economic growth through technology and learning can be done through diversification and product proximity. Diversification allows for catch-up growth and this can be understood not as an “innovation” story, but as a *compilation* story.

By assessing “nestedness” and the product space, we can see a modular-- not homogenous-- look at regional productivity. From this “nestedness” model, having a denser product, or creating a density dome, is better than just “progression.” It is possible to see rapid economic growth, but only if you time it right with product density.

The economic effect of restricting exports is particularly static. Export restrictions serve as unreliable subsidies and take away price signal and actual volume from world market. However, these would still be decent even under neoclassical terms. In terms of dynamic effects, the economic effects of restricting exports results in mature and catch-up growth. However, network growth should be focused on, not mature and catch-up growth. Additionally, this method is not relevant to restrict some intermediate products as there is no real significance to global value chain.

Is there network growth as a result of trade restrictions? It depends. There are many opportunities for diversification as the export restriction doesn't always work. Exports are regulated but not restricted. In restrictive case law, as we shift to a Global Price Veracity Paradigm, a WTO panel report states, "markets respond to signals which are 'broadcast', as it were, through the price which a commodity commands in a given market. It is precisely through price that signals can be sent to and through a market." [...] "[T]he Panel considers that export quotas are liable to send a perverse signal to domestic consumers." The WTO is interested in optimizing innovation, not development or diversification, and it is important to find where the bottlenecks are and incentivize the entry of additional products.

In the speaker's opinion, there is no difference in restricting certain exports, such as base or intermediate products. Rather, what is important is the proximity measure that a country is trying to reach. There is a lot of opportunity for product diversification in Africa. Although export restrictions do not currently work in that way, they might be able to. Under article 11.1 there is room for policy and article 20 there are standard exceptions to GATT. There can still be pressure at the bilateral level to change regulations. A look at cases between the US and China as well as Indonesia and the Dutch Bilateral Investment Treaty shed lights on the legal standing of export restrictions.

In conclusion, under the current cognitive system of the WTO, restrictions there are insufficient room for economic growth within the free market. Furthermore, development exceptions not only should be expanded but also in an economic sense there are mechanisms which allow for a larger policy space.

Tariffications were not specifically discussed in the presentation due to time constraints, though they were touch on at the end. Tariffs are much more restrictive to the WTO and the interpretation that the appellate body gives to these is very much against industrial policies. The WTO interprets tariffs as an attempt to push a certain product or industry in discriminatory way. If the WTO believes that tariffs are being implemented as part of an industrial policy, they will strike it down because they are worried for the balance of trade.

## **CONCLUDING SESSION**

The meeting concluded by agreeing that the next step would be for the authors to finalize their papers for publication in the volume that is expected to emerge from the work of the Task Force. The deadline of April 30 was agreed for submission of these final versions before they enter the publication and associated review process.

