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Economic globalization, trade and forest transition-the case of nine Asian countries

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ABSTRACT

Previous studies have mostly focused on the links between the variability of trade of primary sector products and forest transition. This study more widely discusses the effects of economic globalization on forest transition, and explores the links between trade, adjustment of trade structure, FDI and forest transition in nine Asian countries. The study also expands the scope of forest transition study and integrates the analysis of both forest quantity and quality change in forest transition research. The result suggests that the proportion of forestry products in total exports has significantly negative effects on forest area, forest volume and forest density, while the total export value has positive effects on forest area and forest density. It indicates that one country or region may improve forest resources condition through upgrading the export structure by absorbing FDI in manufacturing and service sectors to develop export-oriented manufacturing and service industries. This study demonstrates the need to introduce forest quality analysis in forest transition study. It also indicates that when exploring the relationship between economic globalization and forest transition, one should consider the overall situations how one country participates in economic globalization and the development and adjustment of its industries in the process of economic integration.

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1. Introduction

Deforestation is directly caused by agricultural expansion, destructive logging, infrastructure development, and forest fires. These direct causes have been in turn influenced by population growth, economic development and policies. The global deforestation debate of the 1980s and the 1990s was complemented with a forest transition debate. Forest transition was, a concept first presented by Mather in 1992 (Mather, 1992) and it signals the beginning of documentation of drivers that could reverse the deforestation trend.

Forest transition refers to a process of forest area decline followed by forest area increase over time. Initially analysts suggested two main drivers: economic development and creation of non-agricultural jobs and forest product scarcity (e.g. Rudel et al., 2005). A focus on non-European and US cases of forest transition suggested the need to broaden the possible drivers that cause forest transition (Lambin and Meyfroidt, 2010; Mather, 2007; Perz and Skole, 2003). Drivers of forest transition equally may vary across different countries and regions, and may also vary in different stages of a country's or region economic development. Factors that possibly could explain forest transition include: agricultural intensification, rural–urban migration, changes of perceptions of resource values, timber and other wood product prices, policy

interventions and institutional development (Foster and Rosenzweig, 2003; Mather, 2007; Mather et al., 1999). The relative importance of factors to explain forest transition has varied over time.

As a result, the forest transition academic debate has seen two phases of theoretical development: the deforestation Environmental Kuznets Curve phase (Barbier et al., 2010; Kauppi et al., 2006; Koop and Tole, 1999; Rudel, 1998; Shafik, 1994) and the forest transition pathway phase (Lambin and Meyfroidt, 2010; Rudel et al., 2005). The deforestation Environmental Kuznets Curve studies focus on the relationship between economic growth and forest transition, while forest transition pathway studies explore the common mechanisms across countries or regions from socio-ecological perspective and formulate five forest transition pathways, which are forest scarcity, state forest policy, economic development, globalization and smallholder tree-based land intensification.

Since the last few decades, international trade has expanded rapidly, importantly because of the liberalization of foreign investments. This economic globalization had a huge impact on politics, economies, society, and culture, and it also had a profound influence on the utilization and conservation of natural resources including forests (Jorgenson, 2008; Klooster, 2003; Mills Busa, 2013). Economic globalization can also be linked to factors that cause deforestation directly or indirectly, but also to factors that cause forest transition (Meyfroidt et al., 2010; Yiridoe and Nanang, 2001; Zoomers, 2010). The increased complexity of international trade and investment, however, made it harder to

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understand the entanglement of forces that are responsible for the dynamics of forest cover change.

Some attention has been given to how globalization impacts reforestation and forest rehabilitation patterns. Studies zoomed in on the effects on forest cover on trade in agricultural and forestry products (Meyfroidt et al., 2010), remittances (Hecht et al., 2006), emigration (Klooster, 2003), and tourism (Kull et al., 2007). An important related effect is the replacement or leakage of deforestation, when the reduction of deforestation in one country or region increases the pressure on forests in other places, for instance when forest commodities or agricultural crops produced domestically are sourced from forest or produced on forest land elsewhere (Gan and McCarl, 2007; Lambin and Meyfroidt, 2011; Wittemyer et al., 2008). For example, an analysis of 176 countries suggested that rich countries meet their demand through appropriating resources from countries with lower GDP per capita, while themselves actively promoting forest conservation (Mills Busa, 2013). Another study on seven developing countries that recently experienced forest transition suggests that relocation of forest extraction abroad accompanied local reforestation (Meyfroidt et al., 2010). About 39% of the regrowth of Vietnam's forests from 1987 to 2006 was achieved by the de facto displacement of land use to other countries (Meyfroidt and Lambin, 2009). A country like Ghana is an example of the negative outcome of deforestation leakage, as it exports forest products to countries that manage to reduce pressure on their own forests (Yiridoe and Nanang, 2001). Table 1 shows that the value of trade of forest products increased rapidly especially after the 1980s across Asia and worldwide.

The impact of FDI on forest transition has yet received relatively little academic attention. FDI research has focused on how it contributes directly to economic growth (Borensztein et al., 1998; Markusen and Venables, 1999; Xu, 2000), but also on how it affects endogenous factors that themselves contribute to economic growth (Gao, 2005; Li and Liu, 2005). A study from several years back on 40 less developed countries found that levels of primary sector foreign investment were positively associated with rates of deforestation (Jorgenson, 2008). Recent research also has documented the land grabbing affect of FDI targeting export oriented food and biofuel production (Zoomers, 2010). For example, in Africa over 50 million ha of farmland was affected by such FDIs (Friis and Reenberg, 2011). However, agricultural and forestry products trade and related primary sector FDI only account for a small fraction of total global trade and related investments. FDI in manufacturing and service sectors helps host countries to prompt the development of export-oriented manufacturing and service industries (Hobday, 1995; Markusen and Venables, 1999). The structural adjustment and relocation of manufacturing and service industries worldwide should also be considered when exploring the effects of economic globalization on forest resources.

Asia was among the fastest economic growth regions during the last three decades. But Asian countries show huge differences in economic growth patterns and trends in forest resource conditions. For example, Japan and South Korea achieved industrialization of their economies before 1980s and their forest areas remained at high percentages of total land areas throughout this period. China benefitted from globalization at a later stage and absorbed large amounts of FDI, as a result of which it was possible to introduce advanced technology to transform and

upgrade domestic manufacturing and services industries. Export-oriented economic development was a great success and lead to broad economic growth in China. Almost simultaneously, the trend of deforestation in China reversed and the country's total forest area increased rapidly. Similar accounts can be given for India and Vietnam, although the scale of FDI and exports were smaller compared to China. Other developing countries in the region such as Indonesia and Malaysia also progressively joined global markets, but with a fluctuating inflow of FDI. Their exports of primary products remained high or declined slowly. Related to that, forest areas have continued to decline in Indonesia and Malaysia in the last three decades.

While most studies on forest transition mainly focus on forest cover dynamics (Mather, 2007; Rudel et al., 2005), we introduce forest quality analysis in this study as supplementary to traditional forest transition research, which only focuses on forest cover change. We try to expand on forest transition dimensions and integrate forest quantity and quality analysis in one study. We assume that the drivers to forest quantity and quality transitions could be quite different and that a forest quality analysis can be meaningful to understand forest transition in addition to forest quantity.

In this paper we undertake a comparative study in nine Asian countries to explore the links between economic integration, trade and forest transition. We especially try to identify how international trade and adjustment of trade structure which is associated with the expansion of FDI affect forest transition. We hope hereby to provide a new theoretical explanation of the forest transition globalization pathway from the perspective of international trade, and consider other drivers than the deforestation leakage dimension as the last one focuses only on the trade of primary products. This paper will thus expand the scope of forest transition studies by integrating the analysis of forest quantity and quality changes to better understand the drivers and implications of forest transition.

2. Data and model specification

In this paper we compare nine countries, including China, India, Japan, South Korea, and Vietnam that have already realized forest transition, and Indonesia, Laos, and Malaysia that were at the moment of comparison still reported to experience net forest cover loss. The last country, the Philippines is in an early stage of forest transition. The variety of forest change dynamics in the nine Asian countries and of factors like economic development phases, of trade volumes and structures, of FDI inflows, offer the opportunity to gain insights into the influence of these factors on the forest transition globalization pathway. The other reason we choose these countries is that the authors participated in a collaborative research funded by APFNet on forest transition with scholars from the nine countries. We explore how in these countries in the process of economic globalization, international trade and adjustment of trade structure affect forest area (FA), forest volume (FV), and forest density (FD, the latter of which is calculated as forest volume per area, i.e. FV/FA). We hope this will lead to insights of the relationship between economic globalization and forest transition.

We constructed a relevant dataset of all the nine countries using FAOSTAT and UNCTADSTAT as the main sources. FAO conducts forest inventories at ten-year intervals since 1970s and verifies data provided by countries with field level information gathered from FAO field offices as well as governmental agencies (Bhattarai and Hammig, 2001). Most of the previous cross-national analyses rely on these official database (Kastner et al., 2011; Kauppi et al., 2006; Mills Busa, 2013). Although there are some limits and problems with these statistics, there is no other reliable source of comparable cross-national forest land statistics for developing countries except FAO (Bhattarai and Hammig, 2001). Details about the advantages and disadvantages of these databases can be found in Mills Busa (2013) and Bhattarai and Hammig (2001). Data for descriptive analysis covers the years from 1980 to 2010. Because of the limited access to forest resources data, the longitudinal dataset for the

Table 1
Trend in the value of trade of forest products [billion US\$].

Year	The world	Asia	
	Export/import value	Export value	Import value
1961	5.16	0.39	0.62
1980	56.65	7.19	16.55
2000	144.85	17.79	43.32
2012	231.25	38.98	92.39

Data source: FAOSTAT.

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