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Trade, Structural Transformation and Income Convergence: Empirical Evidence from the EU and the ASEAN

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Trade, Structural Transformation and Income Convergence: Empirical Evidence from the EU and the ASEAN[1]

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Abstract

The objective of the paper is to provide a comparative overview of per capita income convergence in the EU and the ASEAN nations over the period 2000-2014 and empirically assess the role of trade on income convergence. Previous studies on the issue of per capita income convergence was based on the concepts of beta and sigma convergence. In this paper, the convergence analysis in the EU and the ASEAN is done using measure of income inequality developed by Theil. Theil index of inequality is a multisectoral analytical approach that allows us to examine the process of structural changes that unfold in the EU and ASEAN by the forces of trade, factor movement and other policy changes. In order to examine the structural shift, we have decomposed income into its major components- agriculture, industry and services and panel data analysis is employed using individual theil ratios. The major finding of this paper is that trade is an important catalysis for per capita income convergence in the EU and the ASEAN countries, with international trade having greater impact than inter-regional trade. The difference in impact of extra-regional trade and intra-regional trade is higher in the case of EU than in the case of ASEAN. Further, trade has caused rise in per capita income in a greater extent in the lower income countries of the two groups in comparison with relatively higher income countries, leading to narrowing the gap in per capita income across countries. In addition to trade, factor mobility (capital and labour mobility) were also found to be determinants of per capita income convergence in the EU and the ASEAN. In order to capture policy variable, extended regression model is considered with government expenditure as one of the explanatory variable, in addition to trade and factor mobility. Government expenditure was found to have positive and significant impact on the per capita income convergence across the countries of the EU and ASEAN. However, the impact of government expenditure veils the impact of capital and labour mobility in the case of the EU and labour mobility in the case of the ASEAN.

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1.   Introduction

The occurrence of cross-country per capita income convergence has been debated for long by economists. Standard neoclassical growth models to explain the process of income convergence dates back to Solow-Swan (1956) followed by Barro, Sala-i-Martin (1991, 1992, 1995,1996) Quah (1995), Durlauf (1996), Rodrik (2003,2005) etc. Neither growth theory nor traditional trade theory provide us with strongly convincing result on a very important question – "Does international trade enhance per capita output (income) convergence across different economies?" Trade policy directly affects the flows of goods and services between countries, and free trade leads to the convergence of factor prices in these countries –as per the Factor Price Equalization Theorem (FPE) (Samuelson, 1948, 1949). However, convergence in factor prices does not necessarily imply convergence in incomes, if endowments of factors are very different across countries.

When we look at the above question from the viewpoint of the existing extensive economic growth literature[2] that deals with convergence, we find that nothing appears as to the role of international trade in the convergence process. On the one hand, convergence in the context of the traditional Solow-Swan model (1956) arises in a closed-economy setting. On the other hand, in those endogenous growth models that allow for trade, the focus is on steady-state growth rates rather than convergence in the levels of income in different economies. Recently, few empirical researches have tried to assess the role of trade on income convergence.

The objective of the paper is to provide a comparative overview of per capita income convergence in the European Union (EU) and the Association of South East Asian Nations (ASEAN) nations over the period 2000-2014 and more importantly, to empirically examine the role of trade in reducing income inequality between countries and bringing about per capita income convergence.

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[2] We have done an extensive review of literature on the link between trade, growth and income convergence in the section 2 of this paper.

The motivation of this paper stems from four compelling reasons. First, all the earlier studies on income convergence in the EU and ASEAN are based on the traditional concepts of β- and σ- convergence (developed by Barro Sala-i-Martin). However, economic growth is an evolutionary process where an economy transforms from an agricultural specialization to industries to services and how such evolution contributes to income convergence is unexplained by the single sector growth model of Solow – Swan underlying the Barro Sala-i-Martin analysis of convergence. Moreover, this neo -classical steady state analysis completely ignores the role of trade in convergence. Hence, adopting the Barro Sala-i-Martin analysis of convergence will not be suitable for analyzing the underlying process of structural change that an economy experiences as the forces of trade and factor movements get unfolded in response to exogenous policy shocks. In this paper, the analysis of convergence in the EU and ASEAN is based on theil index of income inequality which provides a multi-sectoral analytical framework, allowing us to capture structural transformation of the economies in response to trade, factor movements and policy shock. Moreover, we have used individual theil ratios to explain dynamic transformation in these two groups of countries. Second, to the best of knowledge, only two papers have tried to assess the link between trade and trade-related policy and income convergence – Baruah et al. (2006) found trade has caused income convergence for the EU-15 countries and Jayanthakumaran et al. (2008) showed that multilateral trade policies had great impact on income convergence among the ASEAN-5 than regionalism. But these studies, like all other earlier studies, have limited their analysis to pre- or early 2000s and not all the countries of the EU and the ASEAN have been included in the analysis. This gives us the motivation to cover the recent time period of 2000-2014 as during this time period, the EU and the ASEAN[3] countries have been witnessed to great economic developments. Finally,

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[3]The Maastricht Treaty, signed in 1993, proved to be the major milestone establishing the EU and setting clear rules for the future single currency. This was followed by the completion of the Single Market which implemented the "four freedoms"—of people, goods, services, and capital within EU, introduction of Euro as single official currency and inauguration of European Central Bank (ECB) in Frankfurt, Germany which was charged with the responsibility for framing and implementing the EU's monetary policy and managing the euro. Post the Maastricht Treaty, the period 2000-2014 saw the biggest enlargement of EU to date, with now 28-member countries (starting with initial 6 founding members), with considerably less developed economies joining the EU.

As far as ASEAN is concerned, Data prior to 2000 will reflect confounding impact of trade and other factors of per capita income convergence as the impact of East Asian Crisis of 1997 will overshadow the impact of these factors considered for the study. After the East Asian Financial Crisis of 1997, a revival of the Malaysian proposal was put forward, calling for better integration of the economies of ASEAN and avoid a future recurrence of Asian Financial Crisis. The ASEAN Free Trade Area (AFTA), which was established on 28 January 1992, includes a Common Effective Preferential Tariff (CEPT) to promote the free flow of goods between member states. The full import of AFTA will be reflected in post 2000 data. Also, ASEAN has been moving towards the creation of a single market and production base and a competitive economic region. Since 2007, ASEAN countries have

thus far there hasn't been any comparative study on per capita income convergence in the EU and the ASEAN. These two particular groups present a wide range of differences[4] in terms of time of formation and advancement, levels of development etc. and hence make interesting case for comparative study to understand whether countries at different stages of development and different levels of openness experience differently towards convergence.

The rest of the paper is organized as follows. In the next section, we review theoretical literature on the link between trade and income convergence. We also review empirical literature on income convergence based on the EU and the ASEAN countries. In section 3, we discuss, the methodological approach of our study and data sources. In the next section, we give a detailed account of our empirical findings and analysis. A comparative analysis of the results on the EU and the ASEAN is done in section. The final section summarises the major findings and concludes the discussion.

2.   The Link between Trade and Income Convergence: Literature Survey

In theory, there three possible ways in which it can be explained how trade brings about per capita income convergence. First, according to Samuelson's FPE Theorem (1949), if two countries having identical technologies, different factor endowments and producing two goods engage in free trade, then the factor prices are equalized across the countries. However, this process itself depends on other factors like tastes, technology and geography. An implication of FPE is that given free trade, countries avoid diminishing marginal returns. But FPE theorem as such has certain discrepancies as it relates to outcomes in the steady-state free trade equilibrium and fails to explain dynamics relating to trade liberalization (Leamer, 1995).

A dynamic equivalent to FPE, factor price convergence (FPC), was later given by Leamer (1995) which captures the idea that freer trade should lead to the convergence of factor prices across countries. In Leamer's words, "When two countries eliminate their mutual trade barriers, product price equalization eliminates factor price differences". Another problem with FPE

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gradually lowered their import duties to member nations. The target is zero import duties by 2016. The Jakarta Charter, 2008 aims at moving closer to "an EU-style community". The charter turned ASEAN into a legal entity and aimed to create a single free-trade area.

Thus, the ASEAN and EU nations have witnessed major economic developments post 2000, making 2000-2014 an interesting period to attempt a comparative analysis.

[4] EU is customs union, while ASEAN is a free-trade zone. EU is in a level of supra-national co-operation while ASEAN is in a level of inter-national co-operation. This means EU countries are all tied to each other – monetarily and financially- more intricately than the ASEAN nations. In terms of trade openness, EU is more open than ASEAN. ASEAN opened up to trade only in the 1990s, whereas EU has been open since the 1950s.

theorem is that it is highly regimented and holds well under a set of stringent assumptions. Paul Samuelson's (1949) early proof requires the fulfillment of eight assumptions including zero trade barriers, no transportation cost, incomplete specialization in production of goods, identical linear homogeneous technology and preferences across regions, and all regions producing all goods. These assumptions hardly hold in practicality. The same problem is attached to FPC theorem as well.

And yet another problem with FPE and FPC is that they take in account only the factor prices. But, per capita income is a function of both factor prices and factor endowments. Therefore, even if trade is leading to the convergence of factor prices as per the FPE or the FPC theorem, per capita income can still diverge if the endowments across the countries are becoming very different over time. Hence, factor price equalization need not ensure per capita income convergence (Farhad Rassekh and Henry Thompson, 1996).

Second way in which free trade can arbitrate international flow of technology and this in turn can influence the per capita income. In fact, a stream of literature, (Balassa 1978; Krueger 1980, Feder 1982; Baumol, 1986; Edwards 1992) emphasized that different levels of technologies prevalent in different countries can be transfused between the countries by means of free trade. These studies explained the benefits of international trade in terms of greater capacity utilization, resource allocation according to comparative advantage, exploitation of technological improvements, economies of scale and competent management in response to competitive pressures abroad, and so on. In a seminal work, Rivera-Batiz and Romer (1991) developed an endogenous growth model to show that a complete integration of a national economy into the world economy through trade would allow the exploitation of increasing returns to scale and the expansion of the extent of the market, resulting in 'a permanent increase in the rate of growth' leading to convergence of national income with world average income. But as is the case with FPE, linking trade facilitated technology flows to per capita income convergence is also subject to the same limitation that per capita income also depends on factor quantities. Again, if the endowments are diverging, then per capita income convergence might not take place.

The third channel through which trade can cause per capita income convergence is through trade in capital goods. Trade in capital goods influences per capita income through its endowment of factor quantities. Income convergence across countries might be triggered by the importing a huge chunks of capital goods by the capital poor countries from capital rich

countries such that the capital-labor ratios across the countries converge. However, the factor price-factor endowment caveat applies here as well. Dan Ben-David (1996) examined the relationship between international trade and income convergence among countries by focusing on groups of countries comprising major trade partners; majority of which exhibited significant convergence. In addition to this research, Ben David and Rahman (1996) evaluated two mechanisms promoting the absolute convergence between countries; the first is based on the convergence of capital intensity ratios and the second on the technological levels. On this basis, they find that groups of countries formed according to a reciprocal exchange are distinguished from others by the convergence of total factor productivity, not of their ratios capital work. Also, Sachs and Warner (1995) indicate that there is direct positive relationship between changes in policies pertaining to trade and per-capita convergence. Trade and investment reforms like the removal of quotas and tariffs tend to induce the resources within a region to be reallocated from a rich nation to a poor nation. The hypothesis that 'openness' can lead to income convergence between rich and poor economies and relatively better economic growth by poor countries, is widely tested (Ventura 1997; Ghose 2004; Dawson 2007; Velde, 2011).

While there have been evidences of income convergence among group of trading nations in many researches as reviewed above, another stream of literature takes an opposite view and argues that trade-exchanges do not always benefit countries and cause huge disparities and fuel income divergence among the countries. Bernard and Jones (1996) have shown evidence that the opening up of economies diverges incomes across countries claiming that the principle of comparative advantage gives primacy to the diversification of the exchanged goods, thus there is, in principle, no reason to anticipate the similarity of production technology nor the convergence of factor prices over time. Besides, Rodriguez and Rodrick (1999) challenge the link between openness and convergence supposed by Ben David (1993) for the countries of the European Free Trade Association.

Slaughter (1997, 2001) challenged the results of Ben David (1996) and rejects the hypothesis that trade leads to income convergence. By applying difference-in-difference approach to compare pre-and post-1945 multilateral trade liberalizations they find that trade liberalization didn't trigger convergence among randomly chosen countries. Baliamoune-Lutz (2001), established that greater openness failed to facilitate convergence to higher income levels, thus supporting the findings of Slaughter (2001). In this context, Pritchett (1997) suggested that the modern economy is characterized by a difference of income and productivity levels between

developed and developing countries. The author further argued that substantiation of the stark disparity between developed and developing countries suffered due to lack of reliable data of the least developed countries. The results presented by Slaughter and Baliamoune-Lutz strongly validate those of Frankel and Rose (1998) and Canova and Dellas (1993) which show that trade openness increases the differences between countries and does not reduce them.

Later, Hallett and Piscitelli (2002) identified the conditions of onset of convergence phenomenon and presented that small economies that are not well integrated converge but countries that are more stable and integrated into the global economy diverge. In the same vein, Park (2003) found that during most of the years during the period 1960-2000, divergence grew between Asian countries and only in the last period that convergence had occurred. Nissanke and Thorbecke (2004) argue that the trade openness is a necessary but not a sufficient condition for successful development in a world of interdependent evolution. They reason that greater openness also tends to be associated with greater volatility and economic shocks, which affect the vulnerable and poor households harder and income inequality at least temporarily, as it happened during the Asian financial crisis.

In our knowledge, only three papers could be listed that study the effect of trade on income convergence. Earliest among these is the seminal study by Ben-David (1993) who used a non-parametric and not regression-based approach for analyzing trade's contribution to the convergence process. The author focused on groups of countries that formally liberalized trade (EEC, EFTA, etc.) and shows that the timing of the convergence process of per capita GDP is related to the timing of the trade liberalization process. Barua et al. (2006), in an attempt to provide an explanation of causes of income convergence, found that trade openness has caused a rise in per capita income in a much greater speed in lower income countries of EU-15 in comparison with relatively advanced countries, resulting in narrowing of per capita income differences across countries. In a most recent study by Miltunovic (2016) used regression analysis to test whether higher volume of bilateral trade causes income convergence. Their empirical results support the hypothesis that income level tend to converge when bilateral trade increases, in particular, if the intensity of trade between two countries is increased by 1%, the income gap will be narrowed by 0.208%. As far as ASEAN is concerned, Jayanthakumaran et al. (2008), using time series analysis, found the evidence of causal relationship between trade and income convergence in ASEAN-5. But, the results in the paper by Masron et al. (2008) indicate that economic growth in ASEAN-5 countries is conditional upon openness and non-existence of external shocks. In the presence of various external shocks, the role of AFTA in

engendering a greater momentum of growth diminishes. In short, despite having a positive effect on ASEAN economic growth, the benefit might not be evenly distributed among the members, thereby triggering divergence rather than convergence among them. However, these studies leave us uncertain on whether and how trade contributes to per capita income convergence among the countries.

3. Methodological Issues and Data

3.1 Methodology

3.1.1 Theil Index of Inequality

In order to measure the levels of inter-country inequality over time, we will use theil index of inequality. To examine the sectoral aspect of the economy, we decompose income (measured as Gross Domestic Product) into three major sectors, viz., agriculture, industry and services. The Theil measure of inequality, often called "entropy," Tx, is defined as follows:

$$T_x = \sum x_i \log(\frac{x_i}{p_i}) \text{---- (1)}$$

where x_i is country i's share in total incomeand p_i is country i's share in total population of the region (ASEAN/EU, as the case may be). We define in the same way the levels of inter-country inequality in components of GDP – agriculture, industry and services.

The inequality measure takes non-negative values only. An equal distribution is denoted by $T_y=0$, which happens when every country's population and its share in the particular indicator (GDP/ income, agriculture, manufacturing, services) are equal. A rise in the value of T_y over time means that GDP inequality is rising over time. Similarly, an extremely unequal distribution implies that $T_y= log(P/P_i)$ where a single country owns all income while all other countries have zero income[5].

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[5] On advantage of this measure is that it is independent of size-variations among regions as has been shown by Azad (1992). Further, the entropy captures all moments of distribution, whereas the commonly used measures such as coefficient of variation or disparity ratio are based upon mean and dispersion only. Moreover, while the coefficient of variation is an average index of inequality for all the regions, the entropy measure apart from giving an average index also provides information on the relative position of a region in the sample as described in terms of ratios, $\frac{y_i}{p_i}$, which we call "Theil Ratios". Another popular measure of inequality is Gini Coefficient, but inequality represented by Gini Coefficient cannot be decomposed into inequality within and between differently defined population subgroups. These are the reasons for our preference of entropy index of inequality over other similar measures for measuring inter-country income inequalities in EU and ASEAN. The Theil index has

3.1.2 Regression Analysis on Theil Ratios

Theil index of inequality gives an idea of the average levels of inequality for a group of countries, there is no way we can find any information from the index how different countries have reacted to exogenous shocks due to policy changes and trade. To assess which factors, do individually influence the position of single country in relation to the others, or more specifically in order to assess the role of trade in income convergence, the following panel regression using theil ratios will be estimated for both the ASEAN and EU.

$$ln(IncomeTheil_{it}) = \beta_0 + \sum_{k=1}^{2} \beta_k * ln(TradeTheil_{it}) + \beta_3 * ln(CapitalMobility_{it}) +$$
$$\beta_4 * (LabourRestrictiveness\ Index_{it}) + X_{it} + u_{it} \quad \text{--------- (2)}$$

Here, subscript i denote the country under study at a particular time, designated by t. The dependent variable, i.e. "IncomeTheil" is the income theil ratio. The independent variable, *TradeTheil*, is the trade theil ratio. Theil ratio (given simply by y_i/p_i) provides information on the relative position of a country in the region with respect to y_i, where y_i can be country i's share of income or country i's share of trade in the region (Barua et al, 2006). For example, if *TheilRatio*=1, then it tells that the share of a country's income in total income of the group is exactly equal to the share of country's population in the total population of the group. So it can be taken as the benchmark of perfect equality if all countries have this share equal to unity. A value less than unity for a country means that the country is lagging behind another country which has a value exceeding unity. *TradeTheil* is an indicator of the intensity of trade among the countries of the trading block (when $k=1$, it denotes intra-region trade) and intensity of international trade (when $k=2$, it denotes extra-region trade) of the countries in trading block. In order to control for the impact of government policies on income inequality, Barua et al (2006) suggest inclusion of theil ratio of government expenditure in addition to theil ratio of trade. So, we include, X_{it} for government theil ratio, as control variable.

For capital mobility index, we use Chinn and Ito's KAOPEN$_t$ index which is a cumulative index that codifies the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. The index assumes higher values for countries that are more open to cross-border capital transactions.

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decomposability properties that make it especially useful. It can indeed be calculated for groups of individuals and decomposed additively into within-groups and between-groups components (that is, the within- and between-groups components add up to the overall index).

Finally, for labour restrictiveness index, unemployment dispersion for each country is calculated by taking mean absolute deviation of unemployment level of this country from the rest of the countries in the region. Higher the unemployment dispersion of a country relative to region, lower is the mobility of labour of that country. In other words, lower value the index takes, higher is the labour mobility between countries.

According to our hypothesis, we anticipate the signs of the coefficients $\beta_{k\ (k=1,2)}$ to be positive as an improvement in relative position of a country's trade (intra-region or extra-region trade, as is the case) is expected to improve its relative position in per capita income, leading to income convergence. Factor mobility may not always prove to be income growth enhancing for the poorer countries. For instance, a gush of capital inflows giving rise to overvaluation of exchange rate and a loss of international competitiveness will hurt income-growth. To shield against such consequences countries' saving rates need to be higher, exchange rates more competitive and inflows channelled to raise productivity. Similarly, labour mobility from depressed to prosperous countries doesn't necessarily equalise wage rate, unemployment movements in labour supply adds to labour demand, leading to increase the income gap between the rich and the poor countries. In fact, taking into dynamic consequence, Myrdal (1957) proposes that factor mobility and trade may work in advantage of more prosperous countries. Theoretically, government expenditure can have both negative and positive effects on income convergence. On the one hand, government expenditure can affect growth adversely because of crowding out effects on private investment (Landau, 1983; Engen and Skinner, 1992). Higher government expenditure also implies high taxes, most of which are growth-reducing due to their distortionary nature (De Gregorio, 1992). It may also be a source of inefficiency due to rent-seeking (Hamilton, 2013). On the other hand, however, government expenditure can play a growth enhancing role by providing public goods and infrastructure, minimizing externalities, ensuring rule of law, and maintaining a reliable medium of exchange. This means our β-coefficients can either take a positive sign or a negative sign, depending on the impacts of trade and factor mobility on income convergence in the EU and the ASEAN.

3.1.3 Income Inequality, Trade and Structural Change

In order to gauge which component of Income - agriculture, industry or services - are significant in the trend of income inequality, we will attempt a cross-sectional regression analysis of income theil index on different sectoral theil indices. Next, to determine the

structural change across the regions due to trade, we will estimate the following semi-log version of augmented Chenery-Syrquin[6] model:

$$X_{it} = \beta_0 + \beta_1(lnY_{it}) + \beta_2(lnY_{it})^2 + \beta_3(lnN_{it}) + \beta_4(lnN_{it})^2 + TRADE_{it} + PCD \text{ -----(3)}$$

Where X is the dependent variable (share of agriculture in GDP, share of industry in GDP and share of services in GDP), Y_{it} is per capita income (GDP) of country i at time t; N_{it} is the population of country i at time t; $TRADE_{it}$ is total trade as percentage of GDP for country i at time t and PCD is "poor country" dummy variable[7]. In order to construct the PCD dummy for the EU and the ASEAN, we first calculate the median[8] income level of the EU-28 and ASEAN-10 countries respectively in the year 2000 (i.e., the initial year of our study). So, the PCD[9] takes value 1 for countries that have per capita income levels below the median income level of the EU/ASEAN in the year 2000.

3.2   Data

We have sourced data on GDP[10], total population, general government final consumption expenditure as percentage of GDP[11]; and total labour force and total unemployment rates, as percentage of total labour force for the EU and the ASEAN countries from World Development Indicators (WDI) of World Bank. The data on country-wise total volume of intra-region and extra-regional trade (export plus import) is obtained from UNCOMTRADE. Chinn and Ito's KAOPEN$_t$ index sourced from Chinn-Ito Database[12].

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[6] The well-known Chenery-Syrquin model provides the basic structuralist view on economic growth. It states that the manufacturing sector is the key sector that provides momentum for economic growth and thus determines the level of income, i.e., as the per capita income rises, the share of industries in GDP also rises and the share of agriculture falls.

[7] A similar exercise was done by Barua et al, 2010 in the Indian context. However, their definition of "poor state dummy" differs from the way we define "poor country dummy" in the contexts of the EU and the ASEAN countries respectively.

[8] We are taking median instead of mean, because we are interested in the relative position of a country with respect to other countries in the group in term of per capita income.

[9] In case of EU, PCD takes value '1' for Bulgaria, Romania, Latvia, Lithuania, Poland, Estonia, Slovak Republic, Hungary, Croatia, Czech Republic, Malta, Slovenia, Portugal, and Greece. In the case of ASEAN, PCD takes value '1' for Cambodia, Lao PDR, Myanmar and Vietnam.

[10]GDP is total GDP of the country at market prices. It is calculated at constant base year of 2010 and is expressed in US dollars

[11] General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defence and security, but excludes government military expenditures that are part of government capital formation.

[12] The dataset is available in the Excel and STATA 12 format. The data file contains the Chinn and Ito capital mobility index series for the time period of 1970-2014 for 182 countries.

4.   Empirical Analysis

4.1   Trends in Inequality Indices

We start by considering the development of Theil index of inequality for the EU and ASEAN during the period 2000-2014. In Table 1 we provide the calculated Theil Inequality indices using (1) for EU for period 2000-2014 for GDP and its sectoral components and Trade; the values for the same variables are calculated for ASEAN and presented in table 2.

Table 1: Theil Index of Inequality, EU 2000-2014

Year	GDP	Agriculture	Industry	Service	Intra- EU Trade	Extra-EU Trade
2000	0.11	0.12	0.11	0.13	0.22	0.18
2001	0.11	0.11	0.1	0.12	0.22	0.18
2002	0.11	0.12	0.1	0.12	0.22	0.18
2003	0.1	0.12	0.09	0.12	0.21	0.17
2004	0.1	0.09	0.09	0.11	0.21	0.16
2005	0.09	0.11	0.08	0.11	0.14	0.16
2006	0.09	0.1	0.08	0.11	0.13	0.15
2007	0.09	0.09	0.08	0.1	0.14	0.15
2008	0.08	0.07	0.07	0.1	0.14	0.15
2009	0.08	0.09	0.07	0.1	0.15	0.15
2010	0.08	0.09	0.07	0.1	0.2	0.15
2011	0.08	0.07	0.08	0.1	0.2	0.14
2012	0.08	0.08	0.08	0.09	0.21	0.15
2013	0.08	0.06	0.08	0.09	0.21	0.16
2014	0.08	0.07	0.08	0.09	0.19	0.15

Source: Author's calculation using WDI, World Bank Database

It can be seen from Table 1 that there is a secular decline in inter-country inequality in income and its components. Thus, in general, we can observe that the inter-country inequality in EU has been decreasing over time. Also, there is hardly a clear trend in theil index of intra-EU trade while there is declining trend in extra-EU trade till 2008.

Table 2: Theil Index of Inequality, ASEAN 2000-2014

Year	GDP	Agriculture	Industry	Service	Intra-ASEAN trade	Extra-ASEAN Trade
2000	0.41	0.21	0.57	0.69	1.67	1.4
2001	0.39	0.2	0.53	0.68	1.63	1.33
2002	0.38	0.21	0.53	0.67	1.59	1.29
2003	0.38	0.21	0.53	0.66	1.78	1.38
2004	0.39	0.21	0.55	0.66	1.75	1.4
2005	0.38	0.2	0.52	0.67	1.67	1.39
2006	0.39	0.21	0.52	0.68	1.68	1.41
2007	0.39	0.22	0.5	0.71	1.59	1.35
2008	0.37	0.21	0.47	0.71	1.47	1.28
2009	0.35	0.21	0.44	0.69	1.43	1.24
2010	0.36	0.22	0.46	0.69	1.38	1.22
2011	0.36	0.23	0.44	0.7	1.34	1.17
2012	0.35	0.22	0.43	0.68	1.31	1.15
2013	0.35	0.22	0.42	0.68	1.29	1.13
2014	0.34	0.21	0.42	0.66	1.27	1.11

Source: Author's calculation using WDI, World Bank Database

As far as ASEAN is concerned, there is a declining trend in theil index of inequality w.r.t. income, industries and services, intra-ASEAN and extra-ASEAN trade but no noticeable trend in theil index of inequality with respect to agriculture.

To get a better picture of the trends in various theil indices, we estimate linear trend for these indices and present the result for EU and ASEAN nations in Table 3 and Table 4 respectively.

Table 3: Theil Inequality Trends, EU 2000-2014

Inequality Index	Average Annual Growth Rate	t-value	Adj. R-Squared
T_{gdp}	**-2.73**	-9.32	0.86
T_{gov}	**-1.08**	-4.58	0.56
$T_{extra-EU}$	**-1.46**	-5.27	0.66
$T_{intra-EU}$	**-0.40**	-0.33	-0.07

Source: Author's calculation using WDI database

The results for EU show that the theil inequality indices have shown a negative trend in all cases. However, the coefficient on theil index of intra-EU trade is insignificant. Also, the corresponding adjusted R-squared negative signifying that the linear trend model for theil index of trade is not well fit. This suggests the presence of significant non-linearity in the trend with respect to intra-EU trade. Therefore, we estimate a non-linear polynomial trend for all theil indices and find that coefficients of time and its higher value up to second degree are all highly significant. Moreover, the estimation result reveal that the intra-EU trade has a decreasing trend initially but later shows an upward trend.

Table 4: Theil Inequality Trends, ASEAN 2000-2014

Inequality Index	Average Annual Growth Rate	t-value	Adj. R-Squared
T_{gdp}	**-1.05**	-7.38	0.79
T_{gov}	**-1.84**	-10.88	0.89
$T_{extra\text{-}ASEAN}$	**-1.60**	-5.96	0.71
$T_{intra\text{-}ASEAN}$	**-2.36**	-7.09	0.78

Source: Author's calculation based on WDI database

The results for ASEAN show that the theil inequality indices have shown a negative linear trend in all cases.

4.2 Regression Analysis

4.2.1 EU: Discussion of Regression Results

Luxembourg, Malta, Romania, Spain and Sweden have no observation for capital mobility index. Hence, we have dropped these countries from our dataset before carrying out analysis regression. So, we have a short panel dataset with 23 countries and 15 years (2000-2014) which is strongly balanced. Presented below is the summary statistics of the variables of interest.

Table 5: EU- Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Income Theil Ratio	360	0.82	0.45	0.13	1.78
Inter-regional Trade Theil Ratio	360	1.12	0.91	0.11	4.34
International Trade Theil Ratio	360	-0.06	0.21	-0.75	0.38
Capital Mobility Index	360	1.89	0.96	-1.19	2.39
Labour Restrictiveness Index	360	4.62	8.58	0	44.82
Theil Ratio of Govt. Expenditure	360	0.83	0.52	0.13	2.22

The countries in EU are quite heterogeneous in terms of economic and financial structures and attitude of the countries towards openness and policies. As such, in our analysis, we have to take these differences into account, otherwise our estimates will give biased. Therefore, we carry out diagnostic tests to check for the presence of heteroscedasticity and autocorrelation in our data. On performing modified Wald test for group-wise heteroscedasticity and Wooldridge (2002) test for autocorrelation, we find that our error terms are both heteroscedastic and autocorrelated. Further, for detecting the multi-collinearity in the data we adopted test of

Variance Inflating Factors (VIF) and get VIF to be around 2.5[13]. Thus, multi-collinearity is unlikely to be an issue in our estimation.

During the period 2000-2014, different countries joined the EU in different years. Out of 23 countries included in our dataset, 12 countries had joined EU prior to 2000. Therefore, we include a dummy variable, "UNION" in the regression model (2) which takes the value 1 if a country was part of EU in a given year, otherwise it takes the value zero. Accordingly, the dummy variable, "UNION" will reflect the impact (if any) of EU membership on reducing income inequality in the member countries.

We have run both fixed effects (FE) and random effects (RE) regressions corrected for autocorrelation and heteroscedasticity followed by Hausman Specification test to choose between the estimates obtained from RE and FE models. Although the Hausman test suggests that FE estimations are more appropriate than RE estimations, we have chosen RE specification over FE because the latter eliminates the effects of omitted heterogeneity, thereby valuable information stemming from the variation between individuals is lost. Higher standard errors and thus imprecise parameter estimates are the consequence of ignoring the variation between individuals (Durlauf et al 2005). In such cases, it is better to rely on the estimations obtained from RE specification.

Table 6 reports the regression results of our RE models that have been corrected for autocorrelation and heteroscedasticity using the method of Feasible GLS (FGLS). FGLS is the method suggested when the form of heteroscedasticity has to be estimated before applying GLS. FGLS estimates the unknown parameters of the regression model when the true error variance-covariance matrix is not known (Greene 2003).

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[13] The rule of thumb is VIF should not exceed the value 10

Table 6: FGLS Estimates for the Impact of Trade on Income Convergence: EU

Dependent Variable: Income Theil Ratio		
	EU	
	Baseline Model	**Extended Model**
Intra-EU Trade Theil Ratio	0.5045***	0.0894***
	(0.0207)	(0.0133)
Extra-EU rade Theil Ratio	1.5364***	0.2839***
	(0.0863)	(0.0471)
Capital Mobility Index	0.0343**	0.0036
	(0.017)	(0.0071)
Labour Restrictiveness Index	-0.0102***	-0.0008
	(0.0015)	(0.0007)
UNION	0.1404***	0.0634***
	(0.0423)	(0.0178)
Theil Ratio of Govt. Expenditure		0.7291***
		(0.0177)
Constant	0.2196***	0.0796***
	(0.0343)	(0.0147)
Test for overall significance of the model	Wald chi2(5) =958.23[a]	Wald chi2(6) =7206.17[b]
(H0: All Slope Coefficients are zero)	Prob> chi2 = 0.00	Prob> chi2 = 0.00
	a: Reject H_0	b: Reject H_0

Standard errors in parenthesis. ***significant at 1% level of significance. **significant at 5% level of significance.

Following broad observations can be drawn from the regression results. In the baseline model, the coefficients on core controls- intra-EU trade and extra-EU trade are positive and highly significant (at 1 per cent level of significance). This implies that a country which improves its relative position in overall trade versus the other countries also improves its relative income position. This finding is in line with Baruah et al (2006) where they find same result for EU-15 countries. It can also be noted that the coefficient on extra-EU trade is higher than coefficient on intra-EU trade implying that extra-EU trade had a greater impact on the process of income convergence. Viner (1950) showed that a customs union intrinsically can either lead to trade diversion or good trade creation, hence a second-best policy compared to global integration, while outward-looking trade policies among the DCs as well as the LDCs will ensure trade creation as against trade diversion (Balassa,1967). Trade creation should result, according to Balassa (19670), if marginal resource allocation is made in accordance with "revealed" comparative advantage of countries. "Revealed" comparative advantage is a euphemism for the relative export performance of individual industries. This can possibly explain lower

marginal impact of intra-EU trade as compared to extra-EU trade in per capita income convergence.

The coefficient of capital mobility is positive and significant at 5 per cent level of significance. This suggests that capital mobility has been a significant driving force of per capita income convergence. The coefficient on labour restrictiveness index is negative and highly significant. Thus, we can conclude that the labour mobility is one of the factors that promote per capita income convergence in EU. In fact, several studies documents how, up until the onset of the financial crisis in 2008, the various phases of EU deepening have led to greater trade integration (Gil-Pareja, LlorcaVivero and Martìnez-Serrano, 2008), more financial integration (Jappelli and Pagano,2010) and more labour mobility (Portes, 2015, European Commission 2015) between EU member states.

As expected, coefficient of the dummy variable, UNION is positive and significant at 1 per cent level of significance validating the fact that accession to EU has contributed to reducing income inequality by improving the relative income positions of member countries.

The results of FGLS regression on the extended model (which takes, in addition, theil ratio of govt. expenditure explanatory variable) interestingly reflect that the coefficients of all the variables, except that of capital mobility index and labour restrictiveness index, are significant at 1 per cent level of significance. As far as our core variables of interest is concerned, the coefficient on extra-EU trade theil ratio is positive and higher than the positive coefficient on intra-EU trade theil ratio. This result is consistent with that of baseline regression model. The coefficient on theil ratio of government expenditure is positive and significant. This suggests that govt. expenditure has contributed to the process of income convergence in EU during the period of analysis. Our finding echoes similar findings by Aschauer (1989), Munnell (1990), Evans and Karras (1994) etc which report that government plays growth enhancing role by ensuring efficient distribution and allocation of resources leading to income convergence.

It seems that the factor mobility indicators are rendered insignificant in the presence of theil ratios of govt. expenditure. It may be due to the fact that govt. expenditure eclipses[14] the effects

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[14] Local government expenditure in terms of investment is found to have a positive effect on subsequent migration (labour mobility) while leaving growth in mean income unaffected (Lundberg, 2001). Shen et al (2015) have shown that the degree of external financing matters for government spending effects in the environment with limited international capital mobility. The importance of accounting for financing sources, however, largely vanishes when international capital mobility becomes high. This may cause government expenditure effect to veil effects of labour and capital mobility.

of capital mobility and labour mobility respectively. Or it could be because of the way the data on government expenditure[15] is defined which doesn't give a complete picture of the nature of government expenditure. In any case, our result/interpretation on the relationship between trade and income convergence doesn't change, albeit difference in magnitude of the coefficients.

4.2.2 ASEAN: Discussion of Regression Results

Brunei Darussalam has no observation for capital mobility index and Myanmar has no observation on government expenditure. Hence, we have dropped both Brunei Darussalam and Myanmar from our final dataset before carrying out empirical analysis. Our final panel dataset has 8 countries and 15 years (2000-2014); it is a strongly balanced long panel data. Summary statistics of the variables used in our regression is given in the following table.

Table 7 ASEAN: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Income Theil Ratio	120	2.46	4.13	0.17	13.86
Intra-ASEAN Trade Theil ratio	120	6.38	14.44	0.12	52
Extra-ASEAN Trade Theil ratio	120	-0.77	2.14	-11.07	0.33
Capital Mobility Index	120	0.08	1.19	-1.89	2.39
Labour restrictiveness Index	120	3.82	4.4	0.16	13.91
Theil Ratio of Govt. Expenditure	120	2.56	4.26	0.08	15.67

Since we have a long panel, rather than trying to control for large number of year (time) effects as we do in short panels, it is better to take sufficient advantage of natural ordering of time (as opposed to individuals) and simply include a trend in time and employ panel GLS method that is more flexible as it allows for heteroscedasticity of error terms, error correlation across individuals and serial correlation of errors for each individual country. We assume that errors are stationary. Table 8 presents panel GLS regression results for both baseline and extended models.

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[15] It has been found by various studies that with relatively bigger interventionist governments are also characterized by lower capital mobility because they tend to segment their capital markets from international capital markets beyond levels that would otherwise occur. For instance, legal restrictions on institutional investors such as insurance companies and pension funds could limit the amount they can invest abroad; alternatively, the risk of capital controls, and changes in government regulations, tax rules, and government procurement rules in ways that are especially disadvantageous to foreign investors, could inhibit flows of direct investment [Feldstein (1994)]. It is, however, not so much that these impediments actually have to be in place to reduce capital mobility; rather it is the perceived risk that these might occur, which could deter investors from shifting capital abroad. As far as our study is concerned, data for government expenditure is aggregative and hence much inference on its impact on capital mobility can't be drawn.

Table 8: Panel GLS Regression Results the impact of Trade on Income Convergence: ASEAN

Dependent Variable: Income Theil Ratio

	ASEAN	
	Baseline Model	**Extended Model**
Intra-ASEAN Trade Theil Ratio	**0.3613*****	**0.3304*****
	(0.0063)	(0.0099)
Extra-ASEAN Trade Theil Ratio	**0.5397*****	**0.5084*****
	(0.035)	(0.0367)
Capital Mobility Index	**0.0187*****	**0.0249*****
	(0.0036)	(0.0036)
Labour Restrictiveness Index	**-0.0179*****	**0.0014**
	(0.0032)	(0.0048)
Theil Ratio of Govt. Expenditure		**0.1243*****
		(0.0239)
Constant	**0.6059*****	**0.3724*****
	(0.0125)	(0.0179)
Test for overall significance of the model (H0: All Slope Coefficients are zero)	Wald chi2(4) = 7008.06[a] Prob> chi2 = 0.0000 a: Reject H_0	Wald chi2(5) = 13190.80[b] Prob> chi2 = 0.0000 b: Reject H_0

Standard errors in parenthesis. ***significant at 1% level of significance.

The results of the baseline model are similar to the results we find in the case of EU. The estimated coefficients of all the explanatory variables are highly significant at 1 per cent level of significance. Unambiguously, the coefficient on intra-ASEAN and extra-ASEAN trade theil ratio are positive, with coefficient of the latter variable higher than that of the former, i.e. as in the case of EU, marginal impact of extra- ASEAN trade is higher than that of intra-ASEAN trade. A positive coefficient on capital mobility index implies significant contribution of capital mobility towards per capita income convergence in ASEAN (In fact, the AEC Blueprint, 2025 talks about ensuring capital account liberalization in ASEAN). These initiatives have triggered free flow of capital within ASEAN which in turn seems to have led to the per-capita income convergence within the region. As expected, the labour restrictiveness coefficient is negative, signifying higher the labour immobility lower will be the income theil ratio, affecting per capita income convergence. In the extended model, labour restrictiveness index is rendered insignificant. The coefficients of all other variables are positive and significant, as in the case of baseline model.

4.3 Trade, Structural Change and Income Convergence

In order to gauge which components are significant in the trend of income inequality, a preliminary investigation into relationship between income inequality and inequality in its components is done by performing regression of theil index of income inequality on the theil

indices of inequalities in its components. The results of EU are reported in table 9 and that for ASEAN in table 10.

Table 9: Regression Results of Income Inequality: EU

Income Theil Ratio	Coefficient
Theil Index of Agriculture	**0.1173**
	(0.1057)
Theil Index of Industry	**0.5676***
	(0.1293)
Theil Index of Services	**0.2956**
	(0.2108)
Constant	**0.0008**
	(0.0102)
N	15
R-Squared	0.9393
Adjusted R-Squared	0.9227

Standard errors in parenthesis. ***significant at 1% level of significance.

The regression results for EU (Table 9) show that only the coefficient pertaining to theil index of industrial inequality is positive and highly significant. Thus, reduction in inequality in the industrial sector has positively affected the reduction in inequality in income. Though the coefficient for agricultural inequality and service inequality are positive, they are not significant.

Table 10: Regression Results of Income Inequality: ASEAN

Income Theil Ratio	Coefficient
Theil Index of Agriculture	**0.1555**
	(0.1742)
Theil Index of Industry	**0.4097***
	(0.0251)
Theil Index of Services	**0.2972***
	(0.0718)
Constant	**-0.0633**
	(0.0539)
N	15
R-Squared	0.9693
Adjusted R-Squared	0.961

Standard errors in parenthesis. ***significant at 1% level of significance.

In the case of the ASEAN, the regression results (Table 10) clearly show that industry and services inequalities positively affect income inequality; their coefficients being highly

significant and positive. Though the coefficient for agricultural inequality is positive, it is not significant.

The above analysis of income inequality index and inequalities in its components gives a picture of the two regions as a whole, it will now be interesting exercise to investigate how the group of poor countries vs. rich countries fared with trade openness and also to determine the structural change across the regions due to trade. For this, we have estimated the model (3) for EU and ASEAN separately, and have discussed the results in the following subsections.

4.3.1 Estimation of Chenery-Syrquin Model: EU

We have a strongly balanced short panel data. Although the Hausman test indicates that FE specification is better fit to our panel data, we have chosen RE specification over FE because the latter eliminates the effects of omitted heterogeneity The RE estimation for the model, corrected for autocorrelation and heteroskedasticity is reported in Table.

Table 11: Structural Change Equation for EU

	Dependent Variable		
	Share of Agriculture	Share of Industry	Share of Services
lnY	-40.547***	47.273***	-1.998
	(15.258)	(16.698)	(22.182)
(lnY)^2	1.885***	-2.336***	0.220
	(0.762)	(0.903)	(1.149)
ln P	1.772	6.612	-4.628
	(2.262)	(15.748)	(16.253)
(lnP)^2	-0.056	-0.292	0.219
	(0.073)	(0.519)	(0.536)
Trade	-0.0005	0.052***	0.049***
	(0.004)	(0.010)	(0.012)
PCD	-0.594	2.435**	2.141
	(0.958)	(4.700)	(4.614)
Constant	205.863**	-236.756	80.5880
	(85.142)	(168.144)	(195.503)
N	420	420	420
R-squared	0.7697	0.3565	0.5113

***Significant at 1%, **Significant at 5%, *Significant at 10%

It can be observed from the table that share of trade has no significant effect on agricultural orientation of EU and the agricultural orientation of poor countries have also declined, although the decline is not significant. It can also be noted that trade has positive and significant effect on increasing the share of industries and services in the EU. Poor countries in EU seem to have gained in share of both industry and services, however, only the gain in share of industry is significant. This explains that poorer countries in the EU have gained in terms of increasing share of industry which led to their catch-up with the high-income countries, resulting in per

capita income convergence in the EU. As far as the coefficients of the control variables are concerned, while the estimated coefficient on income has expected impact on the orientation of agriculture, industry and services; population has insignificant impact on the sectoral shares.

4.3.2 Estimation of Chenery-Syrquin Model: ASEAN

Here, we have strongly balanced long panel data and we employ panel GLS method; the results are presented in table.

	Share of Agriculture	Share of Industry	Share of Services
Table12: Structural Change Equation for ASEAN			
	Dependent Variable		
lnY	-51.456***	58.374***	-0.939
	(4.812)	(5.511)	(4.910)
(lnY)²	2.624***	-3.347***	0.438
	(0.303)	(0.339)	(0.295)
ln P	17.242***	-83.656***	77.788***
	(6.595)	(7.457)	(7.537)
(lnP)²	-0.519**	2.479***	-2.328***
	(0.211)	(0.226)	(0.228)
Trade	-0.032***	0.018*	0.019**
	(0.009)	(0.011)	(0.008)
PCD	-4.08212***	3.945**	10.36302***
	(1.153)	(1.818)	(1.331)
Constant	120.289**	484.657**	-623.229***
	(55.141)	(58.229)	(66.473)
R-Squared	0.8886	0.8347	0.9283

***Significant at 1%, **Significant at 5%, *Significant at 10%

From table 12, we note that the share of trade has significant effect on all the sectoral shares - agricultural, industries and services. While the trade has negative impact effect on agricultural share of the ASEAN, it has positive impact on industrial and services sector. This implies trade is a significant factor in transforming the ASEAN economy from agricultural sector to industrial and services sector. Also, poor countries (CLMV countries) in ASEAN seem to have gained significantly in share of both industry and services (the estimated coefficient of PCD is positive in case of both the shares of industry and services). But the share of agricultural sector in the poor countries seems to have declined (the coefficient of PCD for the agricultural orientation is negative and significant). This explains that poorer countries in the EU have gained in terms of increasing share of both industry and services which led to their catch-up with the high-income countries, resulting in per capita income convergence in the ASEAN. It can also be noted that while income has expected impact on the sectoral share; population has

a negative impact on industry share in ASEAN which could be due to disproportionate expansion of working age population and population majorly being dependent population.

5.   Per Capita Income Convergence in EU and ASEAN: A Comparison

Regional integration has been a major research topic over the last two decades. Bayoumi and Eichengreen (1997) suggest that ASEAN as one of the highly credible candidates for a currency union after EU, although significant differences exist in the integration process between the EU and East Asia (Capannelli and Filippini, 2010). To emphasize, by establishing a single market and production base, the ASEAN Economic Community (AEC) aims at EU-style deeper and broader economic integration between ASEAN member countries. It is in this context, we have embarked on a comparative analysis of per capita income convergence in the EU and the ASEAN, using panel econometric estimation methodology.

At this point it is however important to note that econometrically, it is not possible to directly compare the estimated coefficients of regression models for the EU and the ASEAN. This is because the number of countries of the EU and the ASEAN, included in the model, are different plus the economic characteristics of EU is different from that of the ASEAN. That said, in this section, we provide some broad qualitative comparative inferences on the role of trade and other factors in causing income convergence in the EU and the ASEAN and the structural transformation that ensues in the process.

While the expansion of the EU from 6 founding members to 28 members has significantly increased the EU's diversity, the region still remains dominated by the developed countries and symmetric in comparison to ASEAN, which features developed countries, middle-income developing countries and least-developed countries[16]. This is well reflected by theil indices of income inequality calculated for the EU and the ASEAN; income theil indices for the EU is lower than those of the ASEAN in all the years during 2000-2014.

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[16] In terms of per capita income, "six majors" refers to six largest economies in ASEAN, namely Indonesia, Thailand, Philippines, Malaysia, Singapore and Brunei Darussalam, that are many times larger than the remaining four CMLV countries, viz., Cambodia, Myanmar, Lao PDR and Vietnam. When Vietnam, Laos, Myanmar, and Cambodia joined ASEAN in the late 1990s, concerns were raised about a gap in average per capita GDP between older and newer members. In response, the Initiative for ASEAN Integration (IAI) was formed by ASEAN as a regional integration policy with the goal of bridging this developmental divide, which, in addition to disparities in per capita GDP

From our regression results it is clear that trade, factor mobility and government expenditure have similar effect on the EU and the ASEAN nations. An improvement in trade theil ratios, capital mobility index and theil ratio of government expenditure lead to per capita income convergence among the countries of the EU as well as the among the countries of the ASEAN. Also, labour restrictiveness affects income theil ratio negatively in both EU and ASEAN.

One prominent finding is that while in both the cases of EU and ASEAN, the estimated coefficient of extra-regional trade theil ratio is higher than the estimated coefficient of intra-regional trade theil ratio, the difference in the estimated coefficients of intra-regional and extra-regional trade theil ratios is higher for EU. Asian Development Bank Report (2008) notes that as ASEAN's economic integration in trade increases, a striking feature of the region is that this trend occurs with a parallel increase in ASEAN's trade integration with the rest of the world. But in the EU countries trade more among themselves than with the rest of the world. This becomes very evident from table 11. Intra-EU trade arises from taking advantage of economies of scale (Balassa, 1967).

Table 12: Intra-Group and Extra- Group trade as Percentage of Total Trade of the Group

Year	EU		ASEAN	
	Intra-EU trade	**Extra-EU trade**	**Intra-ASEAN trade**	**Extra-ASEAN trade**
2000	64.42	35.58	22.62	77.38
2001	64.60	35.40	22.12	77.88
2002	65.32	34.68	22.51	77.49
2003	66.19	33.81	24.98	75.02
2004	65.74	34.26	24.96	75.04
2005	64.60	35.40	25.43	74.57
2006	64.20	35.80	25.38	74.62
2007	64.48	35.52	25.50	74.50
2008	63.01	36.99	25.18	74.82
2009	62.95	37.05	24.71	75.29
2010	61.25	38.75	24.90	75.10
2011	60.46	39.54	24.41	75.59
2012	59.06	40.94	24.71	75.29
2013	59.77	40.23	24.52	75.48
2014	60.64	39.36	24.43	75.57
2015	59.80	40.20	23.89	76.11

Source: Author's calculation using data from UNCTAD

Intra- and extra-regional trade are complementary in both EU and the ASEAN (because estimated coefficient of both intra- and extra- regional trade is positive for both EU and the ASEAN). Thus, policy interventions to increase regional trade can also improve the international competitiveness of developing countries, calling for a double-edged policy:

regional integration policy to scale up countries supply capacity, and international integration policy to scale up the demand they face. This has been particularly true for ASEAN. We can observe from table 11 that the share of intra-EU trade has been secularly higher than share extra-EU trade in total trade of the EU during 2000-2015 but for ASEAN, share of extra-ASEAN trade in total trade of the ASEAN has remained higher than that of intra-ASEAN trade. This means that the EU countries have greater scope of gaining in terms of rise in per capita income relative by opening up their trade relations beyond EU.

Our analysis affirms per capita income convergence in the EU and the ASEAN and trade has caused rise in per capita income to a larger extent in lower income countries in comparison with relatively higher income countries leading to narrowing of the gap in per capita income of across countries. While in the EU, reduction in inequality with respect to industries have contributed to reduction of income inequality; in the ASEAN, lowering of income inequality was majorly due to reduction in inequality with respect to industry and services.

In both the EU and the ASEAN, trade has accentuated the structural change process as we have shown that a country which improves its relative position in trade versus other countries also improves its relative income position. In case of EU, trade and positive and significant impact in increasing the share of both industry and services. Also, poor countries seem to have gained in the share of both industry and services, the gain has been significant only in the case of industry. In case of ASEAN, trade has positively contributed in increasing the share of industries and services, and reducing the share of agriculture. Also, poor countries have gained significantly in share of both industry and services. However, the extent of the impact of trade in ASEAN is lower than that in the EU. ASEAN is yet to reap the full benefit of trade.

 As far as demographic transformation is concerned, it is quite different between EU and ASEAN. Population growth in EU is increasing at a very slow pace if at all in EU whereas population is on an increasing trend in the ASEAN. All the EU nations are comparatively at a higher level of development than the ASEAN nations as reflected in their respective theil indices. All this together implies that the EU must be witnessing higher rate of growth in income and therefore an increasing demand for manufacturing. In contrast, income is growing at a much slower pace in many ASEAN countries, especially in the CMLV countries as a result demand for manufacturing may not be growing that significantly. In ASEAN, higher population growth creates higher demand for agricultural goods and services, offsetting the increased demand for manufacturing.

6.   Conclusion

The purpose of this study was to assess per capita income convergence among the countries of the EU and the ASEAN and examine whether trade has been a driving factor in bringing about per capita income convergence in these two groups. The trends in theil index of inequality suggest that there is strong tendency for convergence in the economies of the EU and the ASEAN. The main finding of our analysis is that trade seems to be important catalysis for per capita income convergence in the EU and the ASEAN countries, with international trade having greater impact than inter-regional trade. The difference in impact of extra-regional trade and intra-regional trade is higher for the case of EU than in the case of ASEAN. This is the reflection of the fact that as ASEAN's economic integration in trade increased, there has been a parallel increase in ASEAN's trade integration with the rest of the world. This is not true of the EU countries which are more strongly integrated among themselves than with the rest of the world.

In addition to trade, factor mobility (capital and labour mobility) were found to be key determinants of per capita income convergence in the EU and the ASEAN. The results further suggest that government expenditure had influence on the process of income convergence. Also, trade has accentuated the structural change process. In the EU, trade has positive and significant impact in increasing the share of both industry and services and poor countries in EU have gained in the share of both industry and services, though the gain has been significant for industry. In case of ASEAN, trade has positively contributed in increasing the share of industries and services, however it is significant only in the case of industry and poor countries have gained significantly in share of both industry and services. So, we can conclude that trade has been an important catalysis of per capita income convergence in both EU and ASEAN, however the extent of impact differs.

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