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Free trade areas and intra-regional trade: the case of ASEAN

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Abstract

We study the effects of free trade areas on bilateral trade flows. We review and extend the previous empirical literature by embarking on the modelling of unobserved heterogeneity. We apply our prefered empirical model to the case of the Asean Free Trade Agreement (AFTA). The estimation results suggest that there has been a positive effect of AFTA. More in particular, intra-AFTA trade has grown on average 9% per year from its introduction in 1992 onwards. This empirical fact is contrary to earlier findings, which are typically not so positive about AFTA. It is our impression that these earlier estimates on AFTA are confounded with the effects of unobserved determinants of trade.

Introduction

This study summarizes and extends the existing empirical literature on the potential trade benefits of establishing a free trade area (FTA) and, more in particular, the Asean Free Trade Agreement (AFTA). The last decade several regions in the world have shown a substantial deepening in economic integration. Several stages can be distinguished (Balassa, 1961) of which establishing a free trade area is often seen as an important prerequisite for further economic integration.

The motivation for this research is threefold. First, accurate estimates are important for economic policy, for example in deciding whether to join a free trade area or not. A major reason for the process of economic integration is that it would enhance welfare in the participating countries. An often mentioned transmission channel for achieving welfare benefits is via trade integration of which free trade areas are an important example. However, a priori it is not clear what the eventual welfare benefits are from this type of regionalism. Trade patterns might be altered in several ways, i.e. result in trade creation and trade diversion. The former relates to increased trade between the FTA members, while the latter concerns trade between members and non-members. Trade creation will be welfare enhancing, but trade diversion could distort total welfare benefits and even make them negative (Viner, 1950). Hence, empirical estimates on the trade impact of free trade agreements are necessary for evaluating the merits of trade integration.

Second, establishing a free trade area and analyzing its impact on trade is an interesting case study for evaluating international trade theory, which typically predicts a negative correlation between trade and trade costs. In a recent article Anderson and van Wincoop (2004) give an extensive overview of trade costs, which entail transportation costs, tariffs and nontariff barriers, information costs and transaction costs. Free trade areas obviously decrease tariffs and nontariff barriers as well as transaction costs.

Third, earlier studies on the trade impact of free trade areas have produced a surprisingly wide range of estimates. Baier and Bergstrand (2007) and Glick and Rose (2002) report large and positive trade creation effects indicating a doubling of trade or even more. However, using extreme bounds analysis Ghosh and Yamarik (2004) conclude that the empirical evidence on the trade creating effects of regional trade agreements is fragile. In addition, case studies on particular free trade areas show mixed results. In particular, regarding AFTA estimation results are typically not so positive (Frankel and Wei, 1997; Sharma and Chua, 2000; Elliott and Ikemoto, 2004).

In this study we critically review and extend the existing empirical evidence on the trade implications of free trade agreements ignoring the issue of welfare benefits. In the analysis we will focus especially on East Asia because this region recently has experienced a remarkable increase in intra-regional trade combined with an intensification of trade integration policies. In a recent study from the ASEAN secretariat (2002) it is claimed that the recent increase in trade between ASEAN countries can be attributed to the successful implementation of the AFTA. Our main research question will be whether the increase in these intra-regional trade flows is indeed the result of increased trade integration within this region or simply driven by economic fundamentals like economic growth.

The set up of the remaining of this study is as follows. In the next section we discuss critically various commonly used empirical specifications on the relation between free trade agreements and international trade. The discussion will be centered around the gravity model, which is a commonly used model in the empirical literature. Next, we provide estimation results on a particular free trade area, i.e. AFTA, and compare our results with the existing empirical evidence. The final section concludes.

Gravity model

The gravity model is an often-used model in international economics. The main reason for the popularity of the gravity model is its success in empirical applications. It goes back to Tinbergen (1962) and Pöyhönen (1963), who suggest to use the Newtonian gravity concept to explain bilateral trade (attraction) by the national incomes of the trading countries (mass) and the distance between them (same in physics). Given its empirical success many authors have also provided economic theoretical backings of the model (Anderson, 1979; Bergstrand, 1985; Deardorff, 1998; Feenstra et al., 2001; Alesina and Barro; 2002). The standard gravity model has later been augmented with many other explanatory variables, such as income per capita, trade bloc and currency union membership dummies, and indicators for common cultural characteristics (Rose, 2000).

In stylized form we can write the typical empirical specification of the gravity model based on cross-section data as

(1) $$x_{ij} = c + \beta(y_i + y_j) + t_{ij},$$

where x_{ij} is the logarithm of the value of trade between country *i* and country *j* and y_i is the logarithm of income in country *i*. Empirically trade costs t_{ij} are modelled as

(2) $$t_{ij} = \delta' w_{ij} + \varepsilon_{ij},$$

where w_{ij} includes, among other things, distance and dummy variables indicating common border, common language, free trade agreement, common currency, etc. and ε_{ij} is a disturbance term measuring omitted factors and measurement errors. Parameters of interest for many empirical studies are specific coefficients of the trade cost function (2). For example, regarding the evaluation of the trade impact of free trade areas typically a regional grouping dummy variable is included in the vector of observables w_{ij} and its corresponding regression coefficient is the parameter of interest.

The success of the cross-section model (1)-(2) in earlier applications can be explained partly by the relative high goodness of fit as compared with many other empirical economic models. However, the use of cross-section based gravity models inevitably leads to biased estimates of the parameters of interest because relevant explanatory variables have been omitted and those are correlated with included regressors.

Anderson and van Wincoop (2003) provide a theoretical reason for specification errors in model (1)-(2). They explicitly take into account the relative price effects of a change in trade barriers, which they label multilateral resistance terms. The difficulty is the empirical measurement of these additional explanatories, but one can extend the unobserved heterogeneity in model (1)-(2) by allowing the error term ε_{ij} to have country specific components. This can be achieved by including nation specific dummy variables in the model.

In addition, it is doubtful whether the empirical trade cost function (2) is well specified. In most theoretical models typically trade costs are referred to as being tariffs, transportation costs, etc., but typically the explicit modelling of trade costs is no further specified. Given the broad nature of trade costs (see for an overview Anderson and Wincoop, 2004) we cannot rely on simple specifications like model (2). Instead, we should build more sophisticated models not only relying on a set of observables but also allowing for a substantial amount of unobserved heterogeneity in trade costs.

The specification errors in cross-section based gravity models can be avoided to a large extent by using panel data. Panel data refers to the pooling of cross-section observations over time. Recent empirical gravity models based on panel data (Mátyás, 1997; Wall, 2000; Glick and Rose, 2002) extend model (1)-(2) by including a time dimension, i.e.

(3) $$x_{ijt} = c + \beta(y_{it} + y_{jt}) + t_{ijt} .$$

where x_{ijt} is the logarithm of bilateral trade between country *i* and country *j* in period *t*. Regarding trade costs t_{ijt} typically the following is specified

(4) $$t_{ijt} = \delta' w_{ijt} + \eta_{ij} + \lambda_t + \varepsilon_{ijt} ,$$

where w_{ijt} includes observed trade costs and ε_{ijt} is a disturbance term. Apart from the time dimension the main difference with cross-section models is the inclusion of both country-pair and time specific constant terms with coefficients η_{ij} and λ_t respectively. The country-pair specific effect measures time-invariant trade costs, while the aggregate time trend models common aggregate trends in trade.

Regarding the empirical modelling of gravity models the use of panel data has several advantages over cross-section data. First, in panel data models there exists better control of unobserved heterogeneity, i.e. country-pair and time-specific effects are included. This is an important issue in trade theory because many components of trade costs are not measurable. In a cross-section analysis such unobserved determinants of trade are necessarily captured by the disturbance term. As these variables are likely correlated with observed regressors, the usual least squares estimator is inconsistent. In contrast, having panel data the effects of at least time and country-pair invariant unobserved determinants can be accounted for, so that the source of inconsistency just mentioned is avoided. Mátyás (1997) and Wall (2000) stress the importance of including such unobserved heterogeneity in empirical gravity models based on panel data.

Second, the research question of the impact of falling trade costs on trade is empirically more a time-series question. For example, regarding currency unions Glick and Rose (2002) argue that one should be interested in the effects of joining a currency union and not so much in whether countries within a currency union trade more than non-members. Of course, for studying the FTA effect on trade a similar argument holds. In addition, estimating gravity models the use of panel data has advantages over a pure time-series analysis too. One reason is that the extra time series observations result in more accurate estimates. Another reason is that the panel data approach generalizes country-pair specific studies.

The unobserved heterogeneity in model (4) is typically considered fixed[1] leading to least squares dummy variable estimation. The advantage of fixed over random unobserved heterogeneity is that correlation with observed determinants is allowed for. A potential disadvantage is that the effects of time-invariant measures of trade costs cannot be estimated because the corresponding regressors are perfectly collinear with the fixed effects. However, as long as these effects are not the parameters of interest (as is the case in this study) fixed effect estimation is preferred. It should be emphasized that the use of country-pair specific effects embodies the modelling of bilateral specific factors (distance, common border, common language, etc.) as well as nation specific effects (e.g. multilateral resistance terms) that are constant over time.

Earlier estimation results using model (3)-(4) show surprisingly large trade benefits. Regarding free trade agreements in general Rose (2000), Glick and Rose (2002) and Baier and Bergstrand (2007), for example, report doubling of trade. Many possible explanations are possible for such large effects, but a simple empirical one is that trade has grown by other variables than income. Insofar these unobserved factors are correlated with included determinants (e.g. FTA dummy) this leads to omitted variable bias. Although the aggregated trend λ_t in model (4) might control for this, careful residual analysis by Bun and Klaassen (2007) still shows important country-pair specific time trends. Key explanation for this is that transport costs, transaction costs and the degree of trade liberalization vary not only over time, but also across bilateral trade relations. Ignoring such country-pair specific time-varying trade costs may lead to severe omitted variable bias.

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[1] An exemption is Carrère (2006).

Because it is difficult to measure such country-pair specific time-varying trade costs, it is natural to extend the unobserved heterogeneity in model (4) once more. Indeed, Baltagi et al. (2003) and Bun and Klaassen (2007) have analyzed such extensions. Baltagi et al. (2003) propose to include fixed effects indexed by *it* and *jt*, so that each country has a separate parameter for each time period when it is an exporter and another set of parameters when it is an importer. This is very flexible in the *it* and *jt* dimensions of the panel, because the effects correct for all possible nation-specific variables (such as institutional characteristics, factor endowments, government policy, and cultural aspects) and these are allowed to move unrestrictedly over time. Bun and Klaassen (2007) propose including country-pair specific time trends, i.e. adding $\tau_{ij}t$ to model (4). In the cross-sectional (*ij*) dimension this approach is more flexible, because it allows the trade development over time to be driven by national factors as well as other bilateral trade costs developments.

To test the relevance of the extended unobserved heterogeneity for the currency union effect Bun and Klaassen (2007) use

(5) $$t_{ijt} = \delta' w_{ijt} + \eta_{ij} + \lambda_t + \tau_{ij}t + \varepsilon_{ijt} .$$

This model of the unobserved heterogeneity in trade flows encompasses model (4) used in the empirical literature so far and Bun and Klaassen (2007) applied it to two data sources. First, data on all bilateral combinations of mainly EU and G7 countries are collected yearly from 1967 through 2002. The sample includes one currency union only, i.e. the euro area. Second, the data from Glick and Rose (2002) have been analyzed. This sample includes many different currency unions, mostly involving small and poor countries, but not the euro area. The residuals from models without country-pair specific trends show qualitatively and quantitatively different trends indicating the relevance of extending the unobserved heterogeneity. The inclusion of country-pairs specific trends heavily influences the estimation results. More in particular, the euro effect shrinks from 50% to 3%, while the currency union effect in the Glick and Rose (2002) data decreases from 90% to 22%.

Given the large differences in estimation results depending on the specification of the unobserved heterogeneity, we will use in our empirical analysis below the trade cost function as specified in (5). We will analyze the trade benefits from a particular free trade area, i.e. the Asean Free Trade Area (AFTA) and compare our estimates with empirical results from restricted versions of model (5) used elsewhere in the literature.

Background on ASEAN and AFTA

ASEAN economic integration is an ideal that could be viewed as being simultaneously grounded in both economic ideal and practical necessity. The early impetus driving South East Asian countries towards grouping lay in national security. The majority of founding member states achieved independence in the post-WWII period when communism was a significant threat. At about the time that ASEAN was formed, most of the founding members attained a measure of economic success. As a result, the focus shifted gradually also to economic issues.

As a practical imperative, ASEAN economic integration can be viewed as simply a reaction to the increasingly competitive global trading environment. Member countries have realized early that regional economic integration would provide the market enlargement that could make them more competitive. Such market strength is needed to insure members of ASEAN against the vicissitudes of cyclical fluctuations stemming from the rise of China and India as well as provide them with a voice in dealing with trading blocs like NAFTA, EU or Mercosur.

In order to properly analyze AFTA's success in its stated mission of promoting trade linkages among ASEAN members, we review in this section the history and organizational development of AFTA. We start by summarizing the key milestones achieved by ASEAN since its inception. This is followed by an outline of the workings of the Common Effective Preferential Tariff (CEPT), the main mechanism by which AFTA achieves its objectives.

History

ASEAN came into being through the Bangkok Declaration of August 8, 1967. When the AFTA agreement was originally signed in 1992, ASEAN had six members (Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand). Vietnam joined in 1995, Laos and Myanmar in 1997, and Cambodia in 1999. The site of the signing was certainly significant for being a bulwark against the Cold War threat of the domino theory (Silverman, 1975).

With an early history of close political cooperation such as these alongside gathering domestic economic strength, there had been little impetus to create a European-style community. Closer economic cooperation at a regional level was only first raised twenty years later in 1987, at the third ASEAN summit in Manila. This initiative was formalized a year later, with the signing of the memorandum of the Brand-to-Brand Complementation (BBC) scheme that paved the way for preferential tariffs on transactions between ASEAN member countries on specific automobile parts. Even though this only covered specific manufactured automobile parts, the scheme was significant because it was aimed at automobile companies which were embarking on regional operations in ASEAN countries.

This signing gave impetus for the eventual creation of the ASEAN Free Trade Area, or AFTA, at the Fourth ASEAN Summit in Singapore in January 1992. This agreement laid out a comprehensive program of regional tariff reduction, to be carried out in phases through the year 2008.

CEPT

Trade liberalization must be implemented using tariff-reductions in order to work. In that sense, the CEPT's mechanism for reducing tariffs gradually over time with fixed target for both tariff rates and achievement dates is promising. As its long-run target, the CEPT system aims to ultimately "enact <u>zero</u> tariff rates on virtually all imports by 2010 for the original signatories, and 2015 for the four newer ASEAN."[2] The rules of origin specify a 40% ASEAN content requirement. In the run-up, the CEPT has provided for exclusions in three cases: (1) Temporary exclusions; (2) Sensitive agricultural products; (3) General exceptions. Items not excluded under these special provisions fell under the Inclusion List, which aimed for a tariff band of 0-5% by 2003 for the ASEAN-6, with staggered dates for Vietnam (2006), Laos and Myanmar (2008) and Cambodia (2010).

The most prominent example of the provision for temporary exclusions being invoked occurred with Malaysia for automobiles in 2000. While it had been the aim for all items in this list to join the Inclusion List by 2003, Malaysia delayed tariff reductions on completely-built-up automobiles, and automobile knock-down kits, in order to protect its local auto industry. Eventually, Malaysia reached its target by 1 Jan 2004, a year ahead of schedule.

Progress

Perhaps as a measure of the members' own impatience with the pace of development, AFTA's target dates have been advanced a number of times. The initial aim had been to do so by 2008, but the target date was subsequently moved forward to 2003. During the financial crisis of 1997-98, the target was again advanced when the original six ASEAN-6 agreed to accelerate many planned tariff cuts by one year, to 2002 from 2003.

Despite the enormous increase in publicity and a gathering pace in moving towards its vision, some researchers still contend that AFTA has lacked significant progress (Dee, 2007; Athukorala and Menon, 2006). One possible reason for this view is the fact that bilateral FTAs negotiated by individual ASEAN members appeared to have been more successful in comparison. Three ASEAN members have such links, namely Malaysia (one, with Japan), Thailand (one each, with New Zealand and Australia) and Singapore (seven, with New Zealand, Japan, EFTA, Australia, US, Jordan, and South Korea).

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[2] See http://www.us-asean.org/afta.asp.

Existing empirical studies

It is clear that the CEPT scheme is key to intra-ASEAN trade liberalization. This raises the main research question whether the intra-ASEAN trade expansion of the last decade is attributable to AFTA and especially the CEPT or just driven by other economic developments. Below we review the existing empirical literature using the gravity model to evaluate the trade creating impact of AFTA and more general ASEAN on intra-regional trade.

Frankel and Wei (1997) use cross-section data for 63 countries covering the years 1980, 1990, 1992 and 1994. They estimate a gravity model year by year allowing for coefficients to change over time. The coefficient of a regional grouping dummy variable measuring ASEAN membership is the parameter of interest. This coefficient is found to be significantly larger then zero for all years indicating that trade between ASEAN members is relatively large controlling for traditional explanatories in the gravity model (income and distance). However, no significant change in this coefficient has been found over time indicating that trade creation within ASEAN is not due to increased trade integration in this region.

Sharma and Chua (2000) use panel data for 33 countries covering the period 1980-1995. They estimate a gravity model separately for 5 ASEAN countries (Indonesia, Malaysia, Phillipines, Singapore and Thailand) pooling the data for all years and for several 5-year periods. The coefficients of regional grouping dummy variables measuring ASEAN or APEC membership are the parameters of interest. The former turns out to be negative in most cases (except Phillipines) from which the authors conclude that ASEAN membership does not increase intra-regional trade.

Thornton and Goglio (2002) use data for 10 Southeast Asian countries and three years (1976, 1986, 1996). They estimate a gravity model pooling the data for the three years and separate cross sections for each year. The empirical strategy is to test for statistical significance of the coefficient of a regional grouping dummy variable measuring ASEAN membership as well as for structural breaks in this coefficient over time. Although in the pooled sample they do not find a significant coefficient, cross-section results show increasing significance over time.

Elliott and Ikemoto (2004) use panel data for 35 countries covering the period 1982-1999. They estimate a gravity model pooling the data for several 5-year periods. The empirical strategy is to test for a structural break in the coefficient of a regional grouping dummy variable measuring ASEAN membership. No significant change in this coefficient has been found after the initialization of AFTA in 1992 from which the authors conclude that AFTA has no trade creating effect in its early stage.

Oh and Selmier (2007) use panel data for 143 countries covering the period 1980-2001 to analyze the impact of diplomatic relations on intra-ASEAN trade. They estimate a gravity model pooling the data over all years. The coefficients of a dummy variable measuring the presence of a regional trade agreement and a dummy variable measuring the existence of diplomacy relations are the parameters of interest. Their main result is that ASEAN member countries trade significantly more with each other compared with non-members and, in addition, that ASEAN membership also increases trade with non-member countries through economic diplomacy.

The empirical studies above do not show a clear picture on the merits of AFTA and ASEAN. Of course, they differ in their empirical strategy, choice of sample, variables, etc. They are similar in the sense that they all refrain from using country-pair specific effects or trends. In other words, they exploit model (5) but imposing $\tau_{ij} = 0$ and $\lambda_t = 0$. Furthermore, they model η_{ij} by time-invariant observables e.g. distance and dummy variables measuring common language, common border and trade agreement. With this strategy it is difficult to test the research question of interest, i.e. what is the trade impact of ASEAN (AFTA) over time. Coefficients of FTA dummy variables only measure whether ASEAN members trade is significantly different from non-members but this could be due to many explanations.

Some studies do allow coefficients to vary over time (Frankel and Wei, 1997; Thornton and Goglio, 2002; Elliott and Ikemoto,2004) and test for structural breaks in the ASEAN coefficient. They do not see a clear pattern in the development of ASEAN coefficients at the time AFTA was initialized. This approach seems more fruitful than pooled estimation as it analyzes the change in the coefficients over time, but again the restriction of common fixed effects and time trends in trade are imposed.

It is our impression that earlier AFTA estimates have been confounded with unobserved determinants of trade. In the empirical analysis below we will control for these unobserved factors to a large extent by using a comprehensive source of panel data and by extending the unobserved heterogeneity in the empirical model. Exploiting country-pair specific fixed effects is a natural generalization of the existing empirical models on AFTA used so far. This approach does not rely on specific observed time invariant factors of trade (e.g. distance, common border) and, hence, estimation results are more robust.

In addition, the use of country-pair specific time trends next to aggregate time trends enables to control for relevant economic developments parallel to the establishment of AFTA. For example, the early years of AFTA (1992-1997) coincide with China's rise as a major trading force. It is possible for estimates of AFTA on intra-ASEAN trade to be confounded with the impact of China’s rise on trade. First, ASEAN and China share the same large export markets. Second, China was a major trading partner of all ASEAN members before AFTA and the relationship strengthened through the AFTA years. Because country-pair specific time trends capture growth in bilateral trade, they potentially can control for this relevant parallel development to AFTA. We will show below that the inclusion of country-pair specific effects and time trends indeed is relevant for appropriately modelling the unobserved heterogeneity in bilateral trade flows.

Empirical results

We use the Glick and Rose (2002) dataset. In their original paper Glick and Rose (2002) focus on the currency union effect on trade, but we will concentrate ourselves here on the impact on free trade areas. It is an unbalanced panel of N=11,178 country-pairs from 1948 through 1997, resulting in 219,558 observations. This sample includes many different free trade areas including the AFTA period 1992-1997.

It should be noted that in the original Glick and Rose data AFTA is not recognized as a free trade area. In essence this is true as the CEPT scheme as established in 1992 implies a gradual decline in tariffs over time and, hence, does not imply completely free trade as of 1992. Hence, our results can be viewed best as empirical evidence on AFTA in its early stage. It also implies the use of a somewhat different strategy for quantifying the AFTA effect on trade. The first approach is common in the literature, i.e. constructing a dummy variable indicating AFTA membership. The second approach is to allow the coefficient of the AFTA dummy to vary over time to mimic the gradual decline in tariff rates during the early years of AFTA. In addition, it measures any trade effects due to increased trade integration on top of tariff reductions.

We use model (3) to assess the contribution of AFTA. The dependent variable x_{ijt} is the logarithm of bilateral trade between country *i* and country *j* in period *t* where bilateral trade is the sum of nominal bilateral exports and imports, both in U.S. dollars, divided by the U.S. producer price. The income variable $y_{it} + y_{jt}$ is the log of the product of the countries' real GDP, both expressed in U.S. output. Regarding trade costs we exploit specification (5) and specify $w_{ijt} = (a_{ijt}, at_{ijt}, fta_{ijt}, cu_{ijt})'$. Hence, to measure the AFTA effect, we follow existing studies by including a_{ijt}, a dummy that is one if *i* and *j* belong to AFTA in year *t* (hence it can only be one from 1992 onwards). Thus, we model the AFTA impact as a permanent break in the level of trade for the AFTA country pairs. In addition, we include the interaction term $at_{ijt} = a_{ijt} \times tr_t$ where tr_t is a trend term with zero values before 1993. Hence, its coefficient measures the average annual change in trade between AFTA countries after 1992, where the coefficient of a_{ijt} measures the initial impact in 1992. Finally, to correct for trade increases due to other free trade area arrangements than AFTA we include the dummy variable fta_{ijt} and to allow for currency union effects we include cu_{ijt}.

We estimate our specification assuming the unobserved heterogeneity in the trade cost function (5) to be fixed. The resulting least squares estimators are supplemented by standard errors not only robust to arbitrary heteroskedasticity over time and country-pairs, but also to serial correlation and cross-sectional correlation. Trade flows are correlated over time and across country-pairs, hence we expect similar patterns in the residuals of gravity models. Indeed, Bun and Klaassen (2007) show the usefulness of this additional robustness as otherwise standard errors can be spuriously low.

Table 1 reports estimation results from specification (3)-(5). The first column shows estimation results representing the existing approach in the empirical literature. We restrict the unobserved heterogeneity by excluding country-pair specific time trends, i.e. imposing $\tau_{ij} = 0$ in (5). In addition, we do not allow for a trending AFTA effect, i.e. the coefficient of at_{ijt} is set equal to zero. Regarding the level AFTA dummy we find a significant positive coefficient, which is larger when including country-pair specific time trends as can be seen from the second column. This can be explained by inspecting the residuals of the specification excluding these country-pair specific trends. The average residuals for AFTA country-pairs show a downward trend, which seems to be reverted at the end of the sample, i.e. from the late eighties onwards. It should be mentioned that the observed average trend for AFTA country-pairs is relative to non-AFTA country pairs because we still included aggregated time trends (which exhibit an upward trend). Hence, leaving out the country-pair specific trends results in a downward biased estimate of AFTA as the coefficient of the corresponding dummy variable tries to correct for the relatively downward trend in the AFTA residuals.

The observed residual trends above motivate the use of our alternative approach of modelling the AFTA effect gradually by making the coefficient trending over time. The third and fourth columns of Table 1 show the estimation results for this alternative specification by including the regressor at_{ijt} . Without country-pair specific trends there seems to be a weakly significant AFTA effect, but not time varying. However, with country-pair specific trends included a different picture emerges. AFTA trade seems to have increased gradually over time since the introduction of the CEPT scheme in 1992. On average AFTA trade has increased annually with around 9% from 1992 onwards.

The final column in Table 1 is our preferred specification. We performed some robustness checks to further assess these empirical results. First, generalizing the trending AFTA coefficient by unrestricted year specific coefficients do not alter the results. The point estimates are 0.03, 0.18, 0.27, 0.33, 0.36 and 0.50 for the consecutive years within the period 1992-1997. Second, we redid the whole analysis in Table 1 restricting the sample to country-pairs with at least one AFTA member. The resulting sample is much smaller, i.e. N=992 only. The main empirical result, i.e. a gradual AFTA effect, is similar for this subsample.

In Table 2 we report results from parsimonious specifications used elsewhere in the literature on the trade impact of AFTA. As discussed earlier most studies exploit model (5) but impose $\tau_{ij} = 0$, $\lambda_t = 0$. In addition, they model η_{ij} by time-invariant observables resulting in pooled least squares estimation. The full set of time-invariant regressors used here is equal to those exploited by Glick and Rose (2002), but for sake of brevity we report only the resulting coefficient estimates of distance and a dummy variable measuring a common border. Using fixed country-pair effects and not accounting for other unobserved trends in trade leads to a suspicious low income elasticity of around 0.5. Apparently the inclusion of time trends makes a large difference for accurately estimating this elasticity which value is unity in most theoretical models of trade. Modelling the country-pair effects with distance and a border dummy leads to considerably different estimates. The pooled least squares regressions imply an income elasticity close to unity, but also significant and large AFTA effects. Allowing for a trending AFTA effect leads to perverse results, i.e. a gradual decline in the benefits over time. In addition, the remaining coefficients imply suspicious large benefits regarding currency unions and free trade arrangements other than AFTA. We interpret these empirical findings as additional support to the fact that empirical models without careful control for unobserved trends in trade lead to biased estimation results regarding AFTA.

Concluding remarks

In this study we reviewed the existing empirical literature on free trade areas and international trade with a special focus on AFTA. Two methodological conclusions can be drawn from this analysis. First, analyzing the impact of free trade agreements on trade panel data should be used. Panel data allow for modelling unobserved heterogeneity avoiding omitted variable bias and endogeneity problems. Many trade costs are difficult to measure, hence the possibility to include unobserved heterogeneity in the trade cost function is a main advantage of panel data. Second, having panel data careful specification analysis should be carried out to shed light on the particular model for the unobserved heterogeneity. Regarding empirical gravity models existing specifications for unobserved heterogeneity are not sufficient, but can be extended in various ways.

In the empirical analysis we have analyzed the trade impact of AFTA on intra-regional trade flows. Contrary to earlier empirical models we do not rely upon observable trade cost factors (e.g. distance) to explain trade, but use the panel data dimension of the data to embark on the modelling of the unobserved heterogeneity in bilateral trade flows. In such a way we use minimal assumptions on the trade cost function, while at the same time controlling for a host of unobserved factors. The estimation results suggest that there has been a positive effect of AFTA. More in particular, intra-AFTA trade on average has grown 9% per year from the introduction of the CEPT scheme in 1992 onwards.

The main empirical fact in this study is contrary to earlier findings, which are typically not so positive about AFTA. However, it is clear from the empirical analysis that earlier AFTA estimates have been confounded with unobserved determinants of trade. In this study we control for these unobserved factors to a large extent by using a comprehensive source of panel data and by extending the unobserved heterogeneity in the empirical model. In this way we mitigate the possibility that our estimated AFTA impact on trade is driven by other developments taking place at the same time and in the same region as AFTA. As such our empirical results are an improvement over existing results on AFTA.

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Table 1 Estimation results for specification (3)-(5)

$y_{it} + y_{jt}$	0.93 (0.03)	0.74 (0.07)	0.93 (0.03)	0.74 (0.07)
a_{ijt}	0.19 (0.08)	0.31 (0.13)	0.13 (0.11)	0.07 (0.10)
at_{ijt}	-	-	0.02 (0.03)	0.09 (0.03)
fta_{ijt}	1.02 (0.14)	0.32 (0.08)	1.02 (0.14)	0.32 (0.08)
cu_{ijt}	0.63 (0.08)	0.23 (0.05)	0.63 (0.08)	0.23 (0.05)
η_{ij}	yes	yes	yes	yes
λ_t	yes	yes	yes	yes
$\tau_{ij}t$	no	yes	no	yes

Table 2 Further estimation results for specification (3)-(5)

$y_{it} + y_{jt}$	0.51 (0.02)	1.10 (0.05)	1.01 (0.06)	0.51 (0.02)	1.10 (0.05)	1.01 (0.06)
a_{ijt}	0.67 (0.14)	0.91 (0.24)	0.35 (0.13)	0.34 (0.11)	1.27 (0.31)	0.62 (0.17)
at_{ijt}	-	-	-	0.12 (0.03)	-0.13 (0.05)	-0.10 (0.05)
fta_{ijt}	0.83 (0.15)	1.26 (0.08)	0.94 (0.08)	0.83 (0.15)	1.26 (0.08)	0.94 (0.08)
cu_{ijt}	0.78 (0.11)	1.29 (0.15)	1.33 (0.15)	0.78 (0.11)	1.29 (0.15)	1.33 (0.15)
d_{ij}	-	-1.11 (0.07)	-1.15 (0.07)	-	-1.11 (0.07)	-1.15 (0.07)
b_{ij}	-	0.33 (0.05)	0.33 (0.07)	-	0.33 (0.05)	0.33 (0.07)
η_{ij}	yes	no	no	yes	no	no
λ_t	no	yes	no	no	yes	no
$\tau_{ij}t$	no	no	no	no	no	no

Note: regarding pooled least squares for sake of brevity we only report estimated coefficients of distance and border, the full set of time-invariant regressors used is equal to those exploited by Glick and Rose (2002).