Structure for a protocol

Main title	What is the evidence of the impact of tariff reductions on employment and fiscal revenue in developing countries?
Sub title	
Review group	
Section	PROCOTOL
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1. Background

1.1 Aims and rationale for review

The last two decades have seen the proliferation of regional trade agreements in developing countries. In some cases preferential liberalization has been accompanied by domestic unilateral trade reform. However, despite substantial progress towards trade reform, a major constraint for further liberalization in developing economies is the perception of potential large adjustment costs. This has been clearly manifested, for example, during the current trade negotiations between Africa, Caribbean and Pacific (ACP) countries and the European Union (EU) under the Economic Partnership Agreements (EPA).

Economic theory predicts that tariff reductions induce a shift of resources and factors of production from protected to sectors with comparative advantage. The size of adjustment and the speed for the reallocation on new activities depend critically on the flexibility and well functioning of goods and factor markets. In addition, trade policy changes are often accompanied by other measures that impact the economy, such as macro, exchange rate or investment policies, which also affect the magnitude of adjustment costs and the capacity of countries to take advantage of new export activities. As a result, the severity of adjustment and the ability to generate growth and employment associated to trade policy is uncertain, especially in developing countries where market inefficiencies and failures may be significant.

From a domestic policy point of view, this uncertainty regarding adjustment costs implies more reluctance to sign new trade agreements, especially when trade partners are perceived as being more competitive, and increasing emergence of lobbies and other constituencies that tend to favour protection. This resistance is more pronounced when governments try pursuing further unilateral trade liberalization. Furthermore, these questions lie at the heart of the Aid for Trade (AfT) agenda. Recent years have seen a very large increase in the number of donor related programmes targeting export diversification and adjustment costs from trade in developing countries. Therefore, understanding the likely impact of trade agreements and the impact of existing support programmes is essential in order to design better support policies.

A large number of empirical studies using different methodologies have tried to shed light on these issues. Therefore, the main objective of this review is to summarise this literature and systematise the main results regarding the impact of tariff reductions on employment and fiscal revenue in developing countries in a way that is rigorous academically but at the same time practical and useful for policymakers.

A common problem for policymakers is the sensitivity of the results of empirical work to methodological assumptions. This is especially important in this case, where the most widely used tool for trade policy analysis is *ex ante* simulation using partial equilibrium or Computable General Equilibrium (CGE) models. As a result, an additional objective of this systematic review is to clearly synthesize the bulk of the evidence highlighting clearly the main assumptions, and more importantly, how this *ex ante* evidence relates to *ex post* econometric studies.

1.2 Definitional and conceptual issues

The policy question of this review can be clearly divided into two different but related sub-questions. First, the impact of tariff reductions on employment. This

implies looking at employment changes and reallocations between sectors. Second, the impact of tariff reductions on government revenue.

Reductions in government revenue due to tariff reductions could affect employment via reduction in public employment. However, the size of public employment in developing countries tend to be small, and despite there is some literature analysing the impact of downsizing public sector on employment in developing countries, this tends to be associated to structural adjustment and fiscal consolidation, rather than trade reform (see for example Rama, 1999). In addition, any impact of tariff reductions on firms and employment will also affect tax receipts. However, evidence on this area would require very good longitudinal micro data series. We are not aware of the existence of studies linking both, which has been confirmed by initial searches. Furthermore, the proposed searches for the review would capture any evidence that would link both if it exists. Due to these factors, we propose to treat these two elements separately as two different sub-sections.

Mapping the policy question to the relevant empirical evidence requires several important delimitations and definitions.

Tariff reductions

The first clarification relates to the term "trade deals" originally posed in the formulation of the review question, which is not a common term in empirical trade research. There are three main trade policy processes that are normally analysed in empirical trade research: preferential trade agreements (PTAs), both unilateral and reciprocal, unilateral trade liberalization and multilateral liberalization. The common element of these processes is a reduction in tariffs on imports; although some PTAs go beyond tariffs and include other measures. Regarding the impact on employment and revenues, an initial search of the existing evidence shows that ex post econometric evidence, both country and cross-section, tend to focus on tariff reduction episodes in general, which include both unilateral tariff reductions and tariff reductions resulting from joining PTAs (i.e. evidence on Chile (Levinsohn, 1999), Brazil (Moreira and Najberg, 2000) and Mexico (Revenga,1997)). On the other hand, the main tool for analysing the impact of PTAs has been the use of ex ante CGE simulations. Multi-country and multi-regional models are well suited to analyse selective liberalization episodes. Therefore, a narrow focus on PTAs will restrict substantially the amount of ex post evaluations to be reviewed, and make the review mainly a CGE review.

For this reason, the review will focus on tariff reductions in general as the policy experiment. Since different trade policy processes imply very different degrees of depth and coverage of tariffs reductions, the impact on employment and revenue will depend on the type of tariff reduction. This will require careful consideration during synthesis when comparing different tariff reduction episodes.

Developing Countries

While Social Accounting Matrices (SAMs) have been developed within the CGE literature for a large number of LICs making simulations possible, *ex post* econometric evidence requires micro data, often unavailable or of bad quality in LICs. This implies that most of the *ex post* evidence focuses on developed and non-LIC developing countries. While we will exclude from this review the literature that focuses only on developed countries, we will expand our sample to all developing countries in order to get a sufficient number of studies. It could be possible that

some cross-section studies may include developed countries. We will consider these studies whenever developed countries are not the main focus and developing countries constitute a larger share of the sample. If meta-analysis is possible, we will flag those coefficients from studies that include a developed country.

Ex ante and ex post methodologies

The fact that the larger part of the empirical work in this area corresponds to *ex ante* "quasi-empirical" CGE papers poses an important question for this review: how to synthesise *ex ante,* simulation studies, and *ex post*, econometric, evidence. These *ex ante* studies are empirical in the sense, that they use observed data on sectoral production, employment and trade patterns prior to the policy reform along with secondary empirical information from econometric studies to determine the behavioural parameters of the simulation model.

The synthesis of CGE studies is especially difficult due to the fact that most of the CGE literature lacks *ex post* validation of results and few papers perform Systematic Sensitivity Analysis (Hertel et al., 2007) of the assumed key parameters during simulations. For all these reasons, our approach here is to analyse both strands of the empirical literature separately, while trying to link the main findings of both methodologies, stressing the main assumptions and possible sources of bias and keeping in mind the preference for *ex post* econometric evidence (Section 2.3 describes the methods of synthesis for both methodologies)

Employment effects

A final important clarification relates to the fact that when looking at labour market outcomes from trade reform, one can look at the impact on employment and/or on its return, wages. In fact most of the existing evidence has analysed the impact on wages, which tend to experience larger adjustment than employment levels (Hoekman and Winters, 2005). Although this is a very interesting literature and key for understanding changing patterns in income distribution, the focus of this review is exclusively on employment.

What the theory says

Standard trade theory predicts the reallocation of factors and resources from protected sectors towards comparative advantage sectors following tariff reductions. The Heckscher-Ohlin-Samuelson model predicts that trade will benefit the use of the abundant factor and its return (Stolper-Samuelson). Thus, the speed of adjustment and cost would depend on the flexibility and functioning of domestic factor markets (see Figure 1). This issue has been extensively analysed in the context of the increasing wage disparity between high and low skilled workers in the North. One implication of this literature is the fact that other policies that may affect technological progress may have a simultaneous impact on employment. For example, some authors argue that the increase in imports of capital goods following liberalization can reduce the relative demand for low skilled workers even in labour abundant countries even in export or comparative advantage sectors, increasing unemployment and pushing employment to the informal sector.

The overall effect on employment is, therefore, unclear and depends on the size of initial tariffs, the sector compositions of these initial tariffs, the extent of tariff reduction, the structure of trade partners and the type of simultaneous and complementary policies in place. In addition, it should be stressed that looking at

employment impacts from trade agreements imply a focus on short and medium run employment changes and reallocations, since neoclassical economic theory considers that employment in the long run is determined by macroeconomic policies, factor accumulation and labour market institutions.

Something similar happens regarding tax revenue, while trade reform is likely to imply a reduction in revenue from trade tariffs, especially in the case of large trade diversion in PTAs, the overall impact on government revenue is uncertain (see Figure 2). Often, episodes of trade liberalization and implementation of PTAs have been accompanied by complementary tax reforms. For example, many LICs have introduced VAT after implementing tariff reductions. In addition, the implementation of customs unions requires the implementation of some type of revenue sharing mechanism. As a result, the overall impact on tax revenue is uncertain.

Uncertainty regarding adjustment costs and employment creation is even more important in the case of PTAs, where costs and opportunities will depend on the relative comparative advantage and degree of integration between trade partners.

Summing up, while economic theory gives strong predictions about the impact of trade agreements and trade liberalization on employment and revenue, with factors reallocating from protected to comparative advantage and export sectors, market rigidities and other policies in place imply uncertainty about the size of the impact.

1.3 Research background

An initial search of the literature indicates the existence of several methodologies used to analyse empirically the impact of trade agreements on employment and revenue. Table in Appendix 2.3 attempts to summarise these methodologies.

Regarding the literature on the impact on employment, as suggested above *ex post* evaluations for LICs are scarce, mainly due to data limitations regarding micro datasets. The main methodologies are the factor content literature, which explores changes in the amount of labour used in exports and imports of a given good; growth accounting methodologies, which decompose the contribution of labour to growth; direct impacts on workers reallocation across firms and sectors, and; the estimation of labour demand/employment equations at aggregate, industry or firm level. Clearly, the last two methodologies are better suited to analyse the impact of trade policy on employment, since they directly link tariff reduction episodes to employment changes and inter-sectoral reallocations (See for example Menezes and Muendler, 2007).

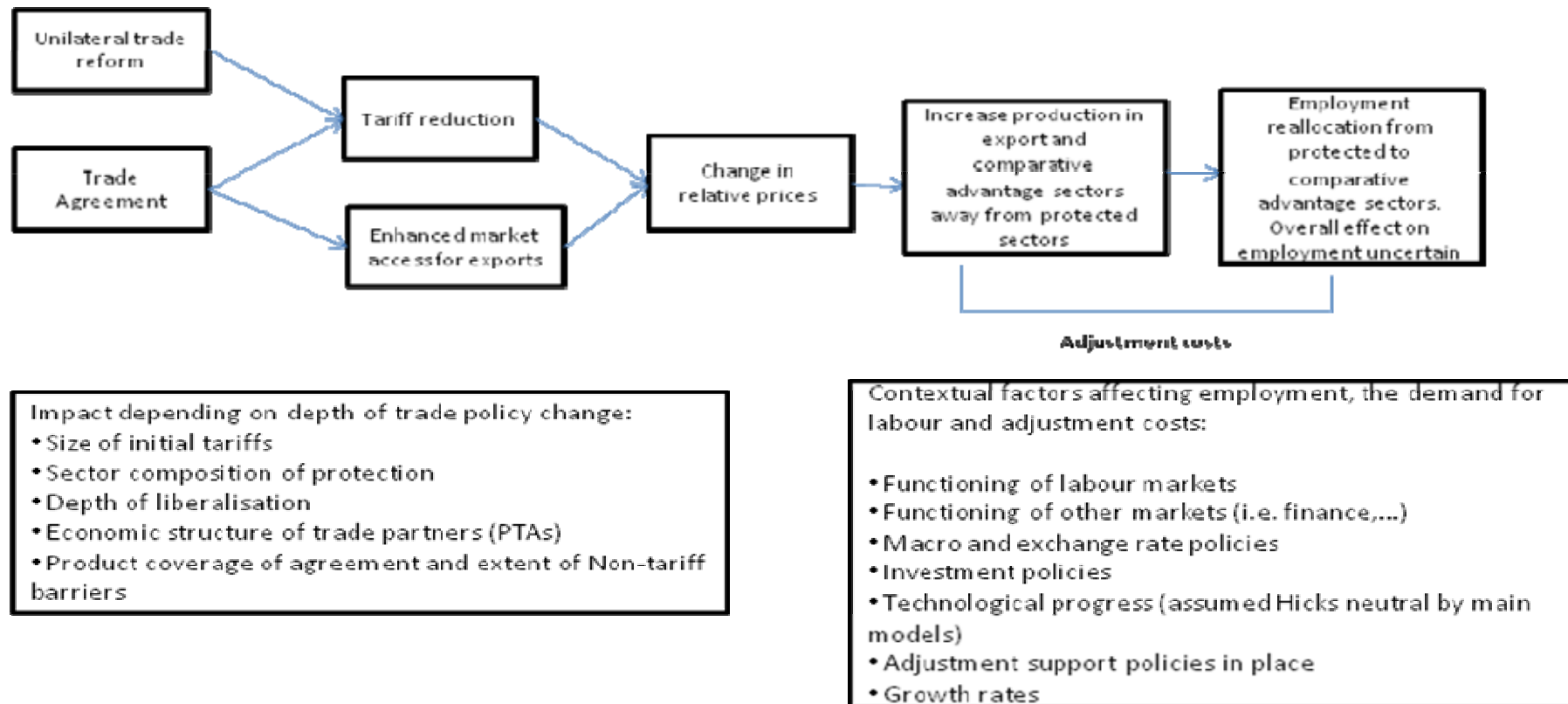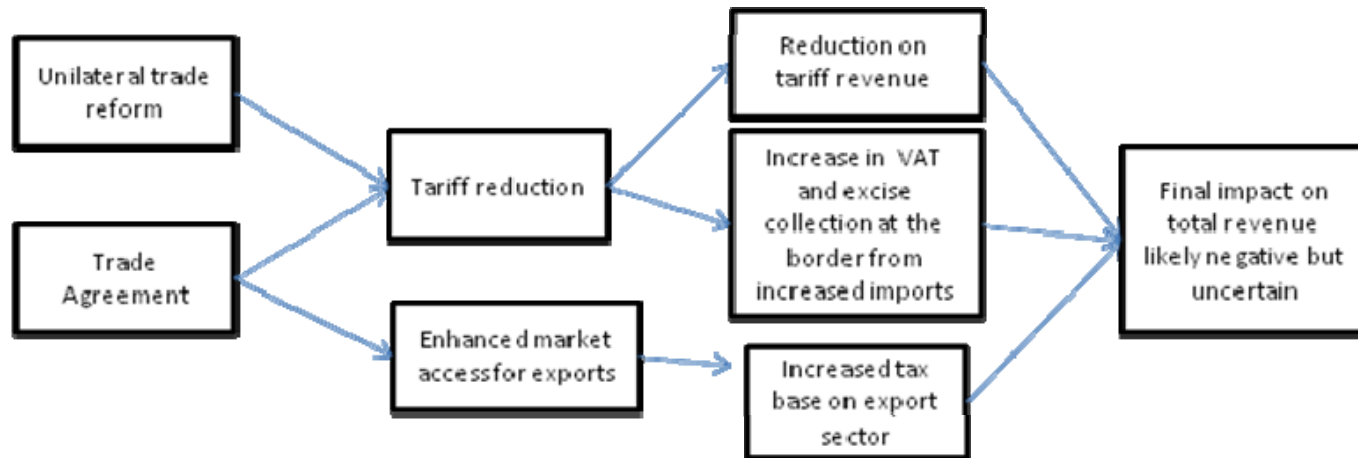*Figure 1 Causal links from trade agreements to employment*

Impact depending on depth of trade policy change:
- Size of initial tariffs
- Sector composition of protection
- Depth of liberalisation
- Economic structure of trade partners (PTAs)
- Product coverage of agreement and extent of Non-tariff barriers

Contextual factors affecting employment, the demand for labour and adjustment costs:

- Functioning of labour markets
- Functioning of other markets (i.e. finance,...)
- Macro and exchange rate policies
- Investment policies
- Technological progress (assumed Hicks neutral by main models)
- Adjustment support policies in place
- Growth rates

Figure 2 Causal links from trade agreements to government revenue

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┌──────────────┐
│ Unilateral   │
│ trade reform │
└──────┬───────┘                      ┌──────────────┐
       │                              │ Reduction on │
       │           ┌──────────────┐   │ tariff       │
       │           │ Tariff       │──▶│ revenue      │
       └──────────▶│ reduction    │   └──────┬───────┘
       ┌──────────▶│              │   ┌──────────────┐         ┌──────────────┐
       │           └──────┬───────┘   │ Increase in  │         │ Final impact │
┌──────┴───────┐         │            │ VAT and      │         │ on total     │
│ Trade        │         │            │ excise       │────────▶│ revenue      │
│ Agreement    │         │            │ collection   │         │ likely       │
└──────────────┘         │            │ at the       │         │ negative but │
                         │            │ border from  │         │ uncertain    │
                         │            │ increased    │         └──────────────┘
                         │            │ imports      │
                         │            └──────────────┘
                ┌────────▼─────┐      ┌──────────────┐
                │ Enhanced     │      │ Increased    │
                │ market       │─────▶│ tax base on  │
                │ access for   │      │ export       │
                │ exports      │      │ sector       │
                └──────────────┘      └──────────────┘
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Impact depending on depth of trade policy change:
• Size of initial tariffs
• Depth of liberalisation
• Dependency on trade related taxes
• Size of trade diversion for PTAs
• Impact on production structure

Contextual factors affecting impact on revenue:
• Complementary tax reform
• Introduction of complementary PTA tax schemes (i.e. revenue sharing under customs union)
• Macro and exchange rate policies
• Growth rates

In addition, an advantage of papers that analyse micro datasets at the firm level is that they tend to use detailed information on tariff reductions. Tariffs are defined at the product level, and micro datasets allow matching products to their specific tariff changes, rather than using broad aggregate and imperfect measures of tariff reductions, as is the case of aggregate studies that analyse the impact on aggregate employment and revenue.

The partial equilibrium and CGE literature on the other hand have been widely employed in the area of PTAs, but also the later for multilateral and unilateral trade reform. This literature is, however, constrained by the assumptions required for solving the models. A common assumption is full employment. Within this set up, only changes in sector employment are of particular relevance. On the other hand, other simulation models may include wage rigidities, which translate into changes in overall employment. An advantage of this literature is the fact that it allows for sector specific results and selective country liberalization. The main disadvantages, however, are the lack of *ex post* validation of results, lack of sensitivity analysis with respect to main assumptions on key parameters and the fact that many coefficients are not reported.

A final type of studies have employed as the main methodology descriptive case studies reporting employment or revenue changes in countries where there has been some liberalization episode. For example, ILO has several case studies documenting employment changes (see for example Majid, 2004), and the IMF regarding revenue changes (IMF, 2005). One common limitation of these case studies is the lack of formal control for other policy changes occurring in the economy at the same time and, therefore, causation is unclear.

The empirical literature on the impact on revenue can also be summarised in the same set of methodological approaches as above. In this case, however, *ex post* econometric analysis for both, country and cross-sections tends to focus on aggregate revenue (Ebrill et al., 1999). This poses the challenge of the trade policy variable to be used and the appropriateness of openness indicators to measure specific unilateral trade reform and PTAs.

1.5 Objectives

Systematic reviews are not common in trade policy analysis. Some surveys have discussed the impact of trade reform on employment (Hoekman and Winters, 2005) and under the debate on globalisation and increasing wage inequality (Goldberg and Pavnick, 2007). More recently Porto and Hoekman (2010) edit a collection of papers about different aspects of adjustment costs to trade reform in developing countries. However, to our knowledge only a few papers provide meta-analysis of specific areas of the impact of trade agreements, although not systematic reviews. For example, Cipollina and Salvatici (2010) provide a meta-analysis of gravity modelling regarding the impact of reciprocal trade agreements. Also, Hess and von Cramon-Taubadel (2007) perform a meta-analysis of partial equilibrium and CGE modelling regarding the potential impact of the Doha Round.

The objective of this review is to perform a systematic review of the existing evidence on the impact of trade agreements on employment and government revenue in developing countries. The review aims at providing quantitative estimates of the impact of tariffs reductions on employment and government revenue. To our knowledge this is the first systematic review in this area. The different methodological approaches existing in the literature require different methods of synthesis. As a result, a second objective of this review is to be able to systematise the impact according to each methodology, at the same time as drawing conclusions on how the results differ or relate across methodologies. A

challenge will be the comparison between *ex ante* simulation results and *ex post* econometric evidence. While *ex post* evidence will always be preferred since it represents external data validation, we aim at providing some guidance on how CGE simulations results compare to *ex post* results, and where they differ, why, including examining the key underlying assumptions and main potential sources of bias in the studies. This may provide a useful guide for researchers in the area of trade policy analysis where simulations have become a very important tool.

2. Methods used in the review

The Review will focus on quantitative studies linking tariff reductions to employment and fiscal revenue in developing countries. From these studies we aim to synthesise quantitative information on impact of tariff reductions. As suggested above, the review will review separately the two main sub-questions. The first question will focus on the impact of trade agreements on employment. The second question will review the impact of trade agreements on government revenue.

The fact that there exist different methodologies implies the need for summarising estimates by methodological approach. In the case where enough papers can be included for each of the methodologies, meta-analysis and meta-regressions will be conducted for analysing impacts on aggregate employment, sectoral employment, tariff revenue and total revenue.

2.1 User involvement

2.1.1 Approach and rationale

The question of this review is of significant importance for trade policy practitioners in developing countries. As suggested above, adjustment costs to trade agreements are often one of the main reasons for policy makers to pursue further trade liberalization. As a result it is important that the review reaches the trade policy arena.

We will communicate with our DFID lead in order to ensure that the review responds to the policy expectations. We will also engage with our DFID lead to communicate preliminary findings, to make sure that the way how the review is communicated is useful for policy advisors. To further engage with policy makers and development practitioners, we will be working with our information department at IDS in order to identify appropriate channels through which the review can be communicated in different policy spaces. The results will be disseminated to IDS subscribers (a large heterogeneous group formed by NGOs, Development Agencies, Government units and embassies, academic institutions in the South, university libraries and individual development practitioners). We will also send the review for comments to our contacts at the European Commission (EC) and the OECD.

Regarding academic users, we aim to present the paper at our internal seminars at IDS/University of Sussex, as well as submitting the paper for journal publication. We also aim to have the paper reviewed by other academics that have worked in the area of trade and adjustment costs and CGE modelling, and we will also consult them in terms of reference searches.

2.2 Identifying and describing studies

2.2.1 Defining relevant studies: inclusion and exclusion criteria

We will concentrate on quantitative studies and exclude those papers where no efforts have been made to control for other factors affecting employment and revenue. These are descriptive studies which only comment on changes in employment and revenue, but where causality is not inferred since there is no formal statistical treatment.

Although inclusion criteria may be considered as broad at this stage, due to the low amount of papers regarding *ex post* evaluations, we prefer to be inclusive and try to correct for potential publication bias and methodological issues using meta-analysis when possible (see next section).

Concretely the following exclusion criteria are proposed:

Both employment and revenue

Ex post studies

- Non-quantitative Studies

- Studies that do not use a proxy of tariff reduction or openness index variable

- Studies that focus solely on Developed Countries

Ex ante CGE

- Exclude studies which do not report the magnitudes of the simulated tariff changes

- Exclude studies in which tariff changes are simulated simultaneously with other policy changes and results are not decomposed into effects due to tariff changes and effects due to other policy shocks

- Exclude Partial Equilibrium simulations

- Studies that focus solely on Developed Countries

Employment

Ex post studies

This section will include all those studies that analyse econometrically the impact of tariff reductions/openness on aggregate and sectoral employment in developing countries. These studies will not necessarily correspond to the literature on the impact of trade agreements/reform on employment, but will also include studies such as those documenting the impact of exchange rates on employment that use controls for openness indicators. In addition, another set of studies focusing on firm level and employment data and the impact of tariff reductions on employment reallocation will also be included. Initial searches indicate about 20 references regarding the first methodology and less than a dozen on the second. As stated above, initial searches indicate that most of these studies consider tariff reductions in general which include signing FTAs and also unilateral trade reform. This will require careful synthesis of results when synthesising results from different trade policy experiments. We will group studies according to similar trade policy experiments (i.e. unilateral reform or PTA) and we will consider a PTA dummy during meta-regression. Finally, we will exclude factor content studies since they refer to more structural changes in the economy.

Ex ante simulation studies

The focus here will be on simulations of PTAs and unilateral preferences in developing countries, although we will also include simulations on unilateral liberalizations in LICs, in order to make the results comparable to *ex post* studies. We will primarily search for those studies that use Systematic Sensitivity Analysis (SSA) (Hertel et al, 2007) and report confidence intervals. However, our initial searches indicate that only a few studies have implemented this methodology. As a result we will also include other studies, and we will deal with different sensitivity analysis with meta-regression if feasible. We will also separate between models assuming full employment, so focusing on sector results, and those assuming wage rigidities that entail economy-wide aggregate employment effects.

We will exclude studies that do not report sectoral and /or aggregate employment or real output effects (as sectoral real outputs are more or less proportional to sectoral employment effects in CGE trade policy studies , real output could be used as a proxy for employment)

Revenue

Ex post studies

This section will include all those studies that analyse econometrically the impact of tariff reductions/openness on government revenue and tariff revenue. We will include both cross-country and single country studies. We will also include other studies that analyse the impact on government revenue of other policies, but that control for trade reform/openness. Our initial searches indicate the possibility of less than 20 studies in this area.

Ex ante simulation studies

Same inclusion criteria as ex ante simulation studies of employment above. We will exclude studies which do not report changes in tariff revenue or total government revenue. In addition, we exclude studies which assume tax replacement (i.e. some other tax rates increase to compensate for lost tariff revenue) but do not report the changes in other tax rates.

2.2.2 Identification of potential studies: Search strategy

In order to identify potential studies the search strategy comprises electronic search, hand search from key journals and reference snowballing form the existing main surveys.

Electronic Searches

The limited number of hits in preliminary searches indicates the need for using several broad terms during searches. This is even more important considering the fact that there are different methodologies and different types of trade agreements. In addition, estimates of the impact of trade openness on employment and revenue can be found outside the trade literature.

We identify five different sets of terms for the searches. The first set refers to the policy experiment, tariff reductions. The following broad terms will be combined. For defining the policy experiment we will use: "tariff reduction" OR "Openness" OR "Trade reform" OR "Trade liberalization" OR "Preferential Trade Agreement" OR "Free Trade Agreement" OR "Unilateral Preferences". We will also use a list of main PTAs in developing countries, in addition to unilateral preference schemes such as GSP, GSP+, Cotonou or AGOA. There are notified to the WTO and in force around 200 FTAs and PTAs involving at least a developing country as member (http://rtais.wto.org/UI/PublicPreDefRepByRTAName.aspx). This implies that a

search combining all the potential PTAs with employment and revenue keywords would imply an enormous search list. For this reason we will focus preferably on regional, rather than bilateral agreements, and agreements in place before 2005. The initial list is in Appendix 1.2, but we will also consider expanding the list if other searches produce a significant number of hits about a PTA not included in the list.

The second set of terms corresponds to employment indicators. Concretely we will use the terms: "employment" OR "unemployment" OR "labour" OR "job".

The third set of terms refers to the second part of the review, the indicators of government revenue. For this, we will use: "tax revenue" OR "fiscal revenue" OR "budget revenue" OR "government revenue" OR "tariff revenue".

The forth set of terms refers to country focus. We will use the terms: "developing countries" OR "low income countries" OR "less developed countries". However, these terms will be combined with the other sets using OR. The reason for this is to be less restrictive, since it is possible that some of the papers are country or region focus, and we would need to include all developing countries names and regions separately not to miss any relevant paper. In addition, some cross-country papers may include developing and developed countries that we need to consider. Therefore, any papers that focus solely on developed countries selected will have to be excluded during the inclusion/exclusion stage.

The final set to identify CGE studies will use the terms: "CGE" OR "Computable General Equilibrium" OR "Applied general equilibrium" OR "general equilibrium analysis")

Two main large searches with the following combinations of terms will be carried out:

(First set) AND (second set) OR (forth set) OR (fifth set)

(First set) AND (third set) OR (forth set) OR (fifth set)

We will also translate the keywords above to Spanish and Portuguese and replicate the searches.

The following databases will be searched and the searches downloaded directly to the EPII reviewer:

EconLit (via CSA Illumina)

IBSS (via CSA Illumina)

Science Citation Index Expanded (Web of Science)

Conference Proceedings Citation Index- Science (Web of Science)

Arts & Humanities Citation Index (Web of Science)

We will also check IDEAS, JOLIS, Eldis and Google search. Screening of these databases will be done online, since searches cannot be downloaded. This implies that only included references, which are not already duplicated, will be integrated in our database.

Index to Theses and the ProQuest dissertation database will also be searched to ensure maximal coverage of unpublished literature. Our starting date for the searches is 1990, since preliminary searches indicate some relevant papers in the early 1990s.

The initial search will be limited to titles and abstracts, and references for papers. This information as well as full text copies for key papers will be coded and managed using the EPPI-reviewer software.

Key journals and databases

We will also search key journals such as World Development or the Journal of Economic Surveys for specific papers in these areas. In the case of CGE papers, we will search in Economic Modelling and the GTAP database

Reference snowballing and other search

We will conduct bibliographic back-referencing and citation tracking of included studies, especially of key surveys of the literature. We will also contact key authors in these areas in order to get access to ongoing and unpublished work.

2.2.3 Screening studies: applying inclusion and exclusion criteria

The inclusion and exclusion criteria will be applied successively to (i) titles and abstracts and (ii) full reports. Full reports will be obtained for those studies that appear to meet the criteria or where we have insufficient information to be sure. Since some of the papers to be searched correspond to the non-trade literature, application of inclusion and exclusion criteria will need to be implemented once examined full reports

2.2.4 Characterising included studies

Table 1 summarises the characterisation of the included studies in the database. Studies will be analysed according to their methodological approach, and for each approach a set of key information will be extracted.

2.2.5 Identifying and describing studies: quality assurance process

Initial searches will be carried out by a librarian and an RA, who will download references and abstracts to the database. From this database the RA and the two researchers will apply the inclusion and exclusion criteria. From the excluded references we will re-examine 5% at random, in order to guarantee consistency in the decisions.

The RA will then characterise the studies according to Table 1. Before starting with full data extraction, we will conduct a pilot stage where the RA and one of the reviewers will extract data independently from three studies, compare extractions, discuss discrepancies and shape the extraction method and definitions according to this comparison. In order to guarantee some further moderation, the researchers will randomly sample 5% of the studies and ensure that appropriate data is extracted for each study.

Table 1 Characterisation of included studies

General Information	Author, publication date, publication type, journal, year, funding agency, author affiliation, abstract.
Methodological Approach	*Ex ante* – CGE *Ex post* – Econometric Analysis
Trade Policy change	Unilateral trade reform PTA Unilateral preferences
Sample	Country, region or cross-section Period of study
Main results	Summary of main findings
Econometric issues	Reduced form equation to estimate – overall employment, sectoral employment, firm level reallocation,.. Type of econometric estimation Does the author correct for potential endogeneity of trade policy variable? What methods are used? Sensitivity analysis and different specifications
CGE issues	Systematic Sensitivity Analysis Type of model – country, Global Main assumptions regarding labour market Main assumptions regarding macro closure Sensitivity analysis reported Baseline year
Key variables	Openness indicators Measurement of tariff reductions and source Measures of employment Measures of government revenue and tariff revenue
Key outcome variables	Econometric studies – according to each methodology coefficient and standard error for reported coefficients on the impact of the trade openness/tariff reduction variable on employment changes (%) and revenue changes (as % of total revenue). Also registration of preferred coefficient by authors and other specifications CGE studies – employment changes (%) and revenue changes (as % of total revenue). if SSA implemented also confidence intervals
Other	Other relevant information

2.3 Methods for synthesis

2.3.1 Assessing quality of studies

The low number of studies in this area implies that we prefer to deal with challenges and quality issues during the meta-regression stage (see below). Rather than removing some papers based on potential econometric problems, we will try to analyse how different types of estimation impact the results.

Concretely the following criteria will be used to determine quality indexes:

Ex post econometric

Higher quality if:

- Econometric analysis that use time-series or panel over cross-sections

- Studies that correct for potential endogeneity of the trade policy variable (i.e. use instrumental variables)

- Peer reviewed, including journal publications, working papers, thesis and other documents that explicitly undergo a process of peer review.

Ex ante CGE

Higher quality if:

- CGE studies that use Systematic Sensitivity Analysis (SSA)

- Peer reviewed, including journal publications, working papers, thesis and other documents that explicitly undergo a process of peer review.

We will also need to flag some studies due to different assumptions, but without any priors on their quality. Concretely:

- Studies which do not state that a fixed exchange rate and a variable trade (or current account) balance is used

- Studies which do not assume tax replacement (i.e. other tax rates increase to compensate for lost tariff revenue).

2.3.2 Overall approach to and process of synthesis

Quantitative synthesis of employment and revenue effects from trade agreements
The main objective for the review is to synthesise the different estimates of the impact of trade agreements on employment and revenue in developing countries. Consequently, we aim to synthesise the main estimates of the literature using meta-analysis. Due to the different number of existing methodologies we will perform the analysis for several sub-groups composed by studies using the same methodology. This implies that the strength of the analysis for each sub-group will largely depend on the number of studies using the same methodology.

In order to analyse the sensitivity of the results to different econometric techniques and assumptions, and to test for heterogeneity, when the number of observations for each methodological sub-group is large enough, we will perform meta-regression analysis using the different estimates available. We will also search for publication bias using funnel graphs (Stanley, 2005). All the quantitative analysis will be performed using STATA software.

A novelty of this review is the fact that we will consider a quantitative synthesis of ex ante simulations. One problem of CGE estimates is the fact that the results are deterministic rather than stochastic, and therefore standards errors are not

available. The SSA approach deals with this issue by considering during the simulations the entire distribution of elasticities for key parameters estimated from the econometric literature (Hertel et al, 2007). Unfortunately, the implementation of SSA in CGE is not common practice. This implies that the impossibility to consider the precision of the estimates for many CGE outcome variables is a challenge for the quantitative review. However, meta-regression analysis will allow measuring the impact of lack of sensitivity on the simulated results for CGE results.

2.3.2.1 Selection of outcome data for synthesis

The key outcome variables for each methodological sub-group are defined in Table 1 above. The synthesis will be carried out at each sub-group level. For example, will not be mixing coefficients related to the impact on labour reallocation with coefficients on the impact on total employment, or CGE with econometric coefficients. Ideally, each sub-level will be composed by studies with the same methodology and comparable coefficients. In addition to the coefficient estimated, we will also extract the standard error associated to include precision in the analysis, which will be measured with 95 percent confidence.

An important element to consider is the fact that in order to maximise the number of observations, we will use several coefficients corresponding to different specifications of the same study when possible. This will require the use of study dummies during meta-regression, but will facilitate the quantitative synthesis.

2.3.2.2 Process used to combine/ synthesise data

As suggested above we will synthesise data for each methodological sub-group. The main reason to do this is to synthesise outcome data that correspond to similar policy processes. For example, estimated coefficients of impact on overall employment will not be combined with estimated coefficients on sector reallocation, or with CGE simulations. As a result, the key challenge of the review will be to interpret and compare the main findings at each methodological sub-group.

The comparison will be especially challenging when comparing the synthesis of the econometric evidence with the CGE literature. It is necessary to stress that econometric evidence will be preferred to quasi-experimental CGE evidence since it is based on inference from existing data rather than simulation. So in a way, the econometric synthesis represents a benchmark of comparison for the CGE synthesis. In our view, this comparison is an attempt to provide some degree of external validation to CGE results, at the same time than informing about key underlying assumptions of the different studies and potential biases.

When findings are conflicting across methodologies we will attempt to explain differences based on the underlying assumptions, potential sources of biases and the quality of the evidence.

2.4 Deriving conclusions and implications

The main results and interpretations will be firstly discussed and analysed within the team. Once a common set of conclusions has been reached, especially regarding the comparison of results, we will discuss the review with colleagues with knowledge in this area within IDS and the University of Sussex, primarily via an internal seminar. This will provide us with a first external review of the synthesis. Once this process is finalised, we will formulate clear policy implications from the results and discus them with DFID. The review will also be sent to a few individual academics with experience in this area for comments, and also to some contacts at the European Commission and the OECD. We would like to present the review at the Lunchtime Economic Seminar at DfID.

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Appendices

Appendix 1.1: Authorship of this report

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Appendix 1.2 List of FTAs for search strategy

RTA Name	Coverage	Type	Date of notification	Date of entry into force
Andean Community (CAN)	Goods	CU	01-Oct-90	25-May-88
ASEAN Free Trade Area (AFTA)	Goods	FTA	30-Oct-92	28-Jan-92
Asia Pacific Trade Agreement (APTA)	Goods	PTA	02-Nov-76	17-Jun-76
CARICOM	Goods & Services	CU & EIA	14-Oct-1974(G) 19-Feb-2003(S)	01-Aug-1973(G) 01-Jul-1997(S)
Central American Common Market (CACM)	Goods	CU	24-Feb-61	04-Jun-61
Common Market for Eastern and Southern Africa (COMESA)	Goods	FTA	04-May-95	08-Dec-94
Commonwealth of Independent States (CIS)	Goods	FTA	29-Jun-99	30-Dec-94
Dominican Republic - Central America - United States Free Trade Agreement (CAFTA-DR)	Goods & Services	FTA & EIA	17-Mar-06	01-Mar-06
East African Community (EAC)	Goods	CU	09-Oct-00	07-Jul-00
EC - Mexico	Goods & Services	FTA & EIA	25-Jul-2000(G) 21-Jun-2002(S)	01-Jul-2000(G) 01-Oct-2000(S)
EC - Morocco	Goods	FTA	13-Oct-00	01-Mar-00
EC - South Africa	Goods	FTA	02-Nov-00	01-Jan-00
EC - Tunisia	Goods	FTA	15-Jan-99	01-Mar-98
Economic and Monetary Community of Central Africa (CEMAC)	Goods	CU	21-Jul-99	24-Jun-99
Economic Community of West African States (ECOWAS)	Goods	CU	06-Jul-05	24-Jul-93
Economic Cooperation Organization (ECO)	Goods	PTA	10-Jul-92	17-Feb-92
Eurasian Economic Community (EAEC)	Goods	CU	21-Apr-99	08-Oct-97
MERCOSUR	Goods & Services	CU & EIA	17-Feb-1991(G) 05-Dec-2006(S)	29-Nov-1991(G) 07-Dec-2005(S)
North American Free Trade Agreement (NAFTA)	Goods & Services	FTA & EIA	29-Jan-1993(G) 01-Mar-1995(S)	01-Jan-94
Pacific Island Countries Trade Agreement (PICTA)	Goods	FTA	28-Aug-08	13-Apr-03
Pan-Arab Free Trade Area (PAFTA)	Goods	FTA	03-Oct-06	01-Jan-98
South Asian Preferential Trade Arrangement (SAPTA)	Goods	PTA	21-Apr-97	07-Dec-95
South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA)	Goods	PTA	07-Jan-81	01-Jan-81
Southern African Customs Union (SACU)	Goods	CU	25-Jun-07	15-Jul-04
Southern African Development Community (SADC)	Goods	FTA	02-Aug-04	01-Sep-00
West African Economic and Monetary Union (WAEMU)	Goods	CU	27-Oct-99	01-Jan-00

Appendix 2.3

Preliminary Structure of the evidence

Methodology	Employment	Revenue	Donor support mechanisms
Ex post evidence	• Small number of papers for LICs because of data intensity • Tends to include both PTAs and unilateral tariff reductions • Main methodologies Labour reallocation – sector or firm level – econometric analysis Labour demand or employment equation – econometric analysis Labour growth accounting – decomposition of labour changes Changes in factor content of exports • Tends to be single country focus	• Small number of papers • Impact of tariff changes or openness indicators on total revenue and trade taxes to GDP • Econometric analysis • Both country case studies and cross section • Other studies looking at revenue issues in LICs may also have results on the impact of trade openness on revenue	• Very small number of papers • Evaluation of specific programmes
Ex ante simulations	• Very large number of studies, including LICs • Large focus on PTA, both unilateral and reciprocal. Also, large number focusing on multilateral liberalization. • Country and regional studies • Partial Equilibrium and CGE simulations • Full employment studies, only allow for	• Very large number of studies, including LICs • Large focus on PTA, both unilateral and reciprocal. Also, large number focusing on multilateral liberalization. • Country and regional studies • Partial Equilibrium and CGE simulations • Macro closure conditions may restrict impact on total revenue	n/a

	analysing sectoral changes. Studies with wage rigidities allow to analyse changes in overall employment • Not all coefficients may be reported		
Descriptive case studies	• Descriptive studies, both *ex ante* and *ex post*, where there is no formal attempt to control for other factors affecting employment	Descriptive studies, both *ex ante* and *ex post*, where there is no formal attempt to control for other factors affecting tax revenue	m/a