

World Bank Knowledge for Change Program - Full Proposal Template

Basic Data:

Title	The incidence of trade policies		
Linked Project ID		Product Line	RA
Applied Amount (\$)	400,000	Est. Project Period	10/01/2018 -12/31/2020
Team Leader(s)	Csilla Lakatos	Managing Unit	DECPG
Contributing unit(s)	DECDG, MTI, IFPRI		
Funding Window	Poverty and Shared Prosperity		
Regions/Countries	World		

General:

1. What is the Development Objective (or main objective) of this Grant?

A period of decreasing poverty and income inequality between countries during the last three decades was accompanied with a trend of increasing within-country inequality (Atkinson, Piketty and Saez 2011; Lakner and Milanovic 2016). The growing concentration of income at the top end of the distribution combined with the declining share of labor relative to capital in national income was associated with a pronounced rise in within-country inequality not only in many advanced economies (AEs) but also in emerging and developing economies (EMDEs). This period was also characterized by the intensifying interconnectedness of the global economy, the expansion of international trade flows, significant trade liberalization efforts and the expansion of global value chains. The two coinciding trends sparked a heated debate on the contribution of globalization and trade to poverty and inequality.

The channels through which international trade affects poverty and income inequality are numerous. A widely accepted presumption is that trade can be a source of economic growth and as a result, an engine of development and poverty reduction (Winters and Martuscelli 2014). Trade allows countries to specialize in the production of goods and services which they can produce most efficiently and leads to better allocation of limited resources. Trade can contribute to the rise of economies of scale and scope and pro-competitive effects. Trade can also result in lower prices, a wider variety of goods and services available to consumers and new employment opportunities. Trade can facilitate the cross-border transfer of technologies, encourage innovation and help EMDEs close their observed productivity gaps (Bustos 2011; Bloom, Draca and Van Reenen 2016). However, the existing literature also highlights numerous channels through which trade can adversely influence poverty and inequality (Goldberg and Pavcnik 2016; Pavcnik 2017). Trade can result in greater competition in import competing sectors and if these are intensive in unskilled labor, put a downward pressure on the wages of the unskilled and even result in loss of employment in these sectors (Autor, Dorn and Hanson, 2013; Pierce and Schott 2016). If trade favors the adoption of skill-biased technologies, it could exacerbate the downward pressure on the wages of unskilled workers (Burstein, Cravino and Vogel 2013). Market failures (e.g. if the poor are in remote locations and disconnected from markets; have limited access to finance; labor market frictions), may mean that the gains from trade do not reach the poorest segments of the population (Atkin and Donaldson 2015; Goldberg and Pavcnik 2003; World Bank and WTO 2017).

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Given these numerous channels, the existing empirical evidence does not capture a systematic relationship between trade and poverty/inequality. As a result, the question whether trade is beneficial for the reduction of poverty and inequality remains an empirical one and the overall impact is found to be highly context specific. The outcome depends on the degree and nature of the trade shocks, the industry and the location in which these occur, the skill composition of workers in liberalized industries, broader economic conditions and the presence of market failures. In this context, the biggest challenge faced by policy makers is to define and adapt policies that boost the pro-growth effects of trade while minimizing the adverse effects of trade on vulnerable population groups and maximize the poor's benefits from the economic opportunities created by trade.

In this project, we aim to examine whether existing trade policies play a key role in shaping poverty and inequality across countries and on how trade policy reform could be designed to tilt the playing field in favor of pro-growth and pro-poor impacts of trade. At the moment, there is little to no information available about the incidence of existing trade policies for households at different levels of the income distribution and across countries. Key questions for which we lack answers include: Are existing trade policies progressive or regressive? Do the poor bear a disproportionate burden of trade policy distortions already in place? How do countries compare against each other? If trade policies are regressive, what would be the policy changes that could tilt the playing field in favor of pro-growth and pro-poor aspects of trade? The objective of this project is to fill these knowledge gaps and to develop an analytical framework including three pillars:

- a) construction of a comprehensive cross-country database on the incidence of trade distortions across households at different levels of the income distribution;
- b) development of analytical tools to quantify the poverty and inequality effects of trade policy changes;
- c) piloting the data and models in the ongoing Pakistan Trade and Investment Policy Program (PTIPP).

Summary description of Grant financed activities

- a) *Construction of a comprehensive cross-country database on the incidence of trade distortions:* What is the incidence of trade distortions for households across the income distribution in different countries? Are tariffs regressive or progressive? Tariffs for which products/industries contribute the most to the progressiveness or regressiveness of trade policies? How do countries compare against each other?

This first component of the project requires matching household survey data on expenditures and sources of income with data on trade distortions at the very detailed level. Key data sources used are the following: an extensive set of household and income surveys; tariffs and trade data from the World Bank WITS database; a broader data set of trade distortions in food and agricultural sectors captured by the Ag-Incentives database¹ and the recently released World Bank database on the ad-valorem equivalent (AVE) of NTMs at the product level (Kee and Nicita 2018 forthcoming).

Household surveys for 107+ countries that capture detailed information on the structure of household expenditures have been made available to the team by Development Data Group. These surveys cover 19 advanced economies (AEs), 67 emerging and developing economies (EMDEs) and 21 low income countries (LICs), accounting for about 6 billion of the world's population and provide a basis for making detailed assessments of global impacts. These surveys also differentiate between consumer expenditures on purchased goods and services, and home produced/gifted goods and services, and include information on other sources of income. They provide considerable detail on the agricultural products that contribute a large share of the income of the poor and a similarly large share of their expenditures.

¹ Available at ag-incentives.org. The database consolidates and harmonizes different data sources on existing agricultural distortions and has result of the collaboration effort among international organizations such as OECD, FAO, IDB, IFPRI, World Bank and CGIAR.

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The product classification of all surveys has been harmonized to match the Classification of Individual Consumption by Purpose (COICOP) and to cover 108 categories of goods and services. In a first step, we will develop a correspondence between the COICOP classification and the Harmonized System (HS6) - the classification at which tariffs and trade data are defined on a comparable basis across countries. In addition to tariffs, we aim to consider a broader set of trade policy distortions for food and agricultural commodities based on the Ag-Incentives database as well as measures of non-tariff barriers. In a second step, we will calculate average trade barriers faced by consumers at different levels of the income distribution across countries.

The database developed in this pillar will be a self-standing product that will become a public good. It will include different indicators on the incidence of trade distortions. These data can serve as communication and advocacy tool in the World Bank's work with client countries to reduce the potential disproportionate burden of trade barriers on the poor. In addition, this database will feed the analytical model developed in the second pillar. Working in close cooperation with DECDG, we will ensure that we have the widest set of surveys, updated to the most recent year and that the correspondence between COICOP and HS classification is designed in a way to fit the purposes of this project.

b) Development of an analytical framework to measure the poverty and inequality implications of changes in trade policies: What are the poverty and inequality implications of trade policy reforms? How can policy makers minimize the burden of trade distortions on the poorest segments of the population? The liberalization of which products can contribute to boosting the pro-poor aspects of trade?

To measure the impact of trade policy reform at the household level, this project builds on the analytical framework developed in Ivanic and Martin (2017). The framework uses a top-down approach and combines economy-wide global computable general equilibrium (CGE) modelling with household models aimed to fully capture the detailed sectoral income and expenditure detail from available household surveys developed in the first phase of the project. In the first step, an economy-wide CGE model is used to infer a set of changes in factor and goods prices as well as effective producer output prices. In the second step, these prices are assumed to be exogenous and used to measure the poverty and inequality impacts. We propose a dual specification of household behavior that provides a Dixit and Norman (1980) style money measure of the welfare impacts of protection, taking into account the direct impacts of changes in prices and wages and the adjustments made by households in response to these changes in consumption, production and wages.

While the idea of combining economy-wide models with microsimulation techniques to measure the poverty and distributional effects of trade liberalization is not a new one (Bussolo, Hoyos and Medvedev, 2010) and is often used in World Bank work, the innovation of the analytical framework proposed here lies in innovations built into the household models described in detail below. Compared to recent advancements in methodology on measuring the distributional effects of trade liberalization (Artuc, Porto and Rijkers, 2017), this approach captures not only the first order but also the second order effects of trade reform. In addition, it does not assume perfect transmission of changes in the tariff equivalents of protection to domestic prices.

c) Piloting the data and model in ongoing operational work: How can this data and modeling tool help the World Bank and its client countries?

This project will have an important capacity-building component aimed at familiarizing World Bank client countries with the incidence of their existing trade policies on households at different levels of the income distribution. The database combined with the methodological framework will also be used to provide advice on potential reforms that minimize the burden on the poorest segments of the population. The project will be piloted in the ongoing Pakistan Trade and Investment Policy Program (PTIPP) under P157197 Trade Strategy Development lead by the Macroeconomics, Trade and Investment (MTI) Global Practice. The Government of Pakistan is currently undertaking an ambitious trade policy reform agenda aimed at increasing the countries' export competitiveness and regional

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integration. This deliverable will be an important part of the dialogue with the authorities aimed to highlight the importance of examining the poverty and inequality implications of trade reforms in a country where close to 30 percent of the population lives below the national poverty line.

2. **What are the main risks related to the Grant financed activity? Are there any potential conflicts of interest for the Bank? How will these risks/conflicts be monitored and managed?**

As in the case of any empirical analysis, the results generated by this project strongly depend on the data used as inputs and the necessary *ex-ante* assumptions made regarding model parameters, baselines, functional forms, etc. These will be reduced primarily by choosing a team with substantial experience in linking data on trade distortions with national and household models. The approach builds on previous work that is slightly more narrowly focused, but has provided a great deal of experience in dealing with the problems at hand. Sensitivity analysis will also be used to assess and reduce the sensitivity of results to the most important parameters and assumptions. There are no conflicts of interest foreseen at this point.

3. **(Optional question) What can/has been done to find an alternative source of financing, i.e. instead of a Bank administered Grant?**

KCPIII Specific:

1. **How does (do) the objective(s) of this proposal align with the World Bank Group's twin goals? What are the key thematic research questions being addressed in this research?**

This proposal links strongly to the World Bank's twin goals of eliminating poverty and boosting shared prosperity. As shown by existing empirical evidence, there's no systematic relationship between trade and poverty/inequality. As a result, the question remains an empirical one and the overall impact is found to be highly context specific. The database to be developed in the first phase of the project will be unique in its topic addressed as well as its country coverage. It can be very useful as an advocacy and communication tool in discussions with World Bank client countries to induce change in trade policies that will minimize the adverse impacts on the poor. The analytical tool to be developed in the second phase of the project will allow us to tackle the context specific nature of the relationship between trade and poverty/inequality and apply it to the *ex-ante* estimation of the poverty and distributional impacts of trade policy change for different client countries.

2. **Describe analytic design & methodology. Elaborate on hypotheses, conceptual framework, data (survey design if applicable).**

To measure the impact of changes in trade policies at the household level, this project builds on the analytical framework developed in Ivanic and Martin (2017). The framework uses a top-down approach and combines a global computable general equilibrium (CGE) model with a household model aimed to fully capture the detailed sectoral income and expenditure detail from available household surveys developed in the first phase of the project. In the first step, a global CGE model is used to infer a set changes of factor and goods prices as well as effective producer output prices. In the second step, these prices are assumed to be exogenous and used to measure the poverty and inequality impacts using a household model. While the idea of combining CGE models with microsimulation techniques to measure the poverty and distributional effects of trade liberalization is not a new one (Bussolo, Hoyos and Medvedev 2010) and is often used in World Bank work, the innovation of this methodology lies in new developments at the household modeling stage described in detail below.

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We propose a dual specification of household behavior that represents each households' response to trade policy reform through changes in consumption, production as well as changes in wages. A Dixit and Norman (1980) style money measure of household welfare W at given utility level, u , is used:

$$(1) \quad W = \pi(p, w) - e(p, w, u) = z(p, w, u),$$

where $\pi(p, w)$ is a profit function representing the profits generated by any unincorporated enterprise operated by the household at commodity prices, p and factor prices, w ; $e(p, w, u)$ is the household's full cost function at commodity prices, p , factor prices, w and utility level, u . Following standard duality, the derivatives of π , e , and z with respect to prices are the quantities supplied, π_p , the compensated quantities demanded, e_p , and net exports of commodities. The derivative of π with respect to w , π_w , is the negative of the quantity of labor demanded by the farm firm; the derivative of e with respect to w , e_w , is the negative of the quantity of labor supplied by the household; and $z_w = \pi_w - e_w$ is the household's net supply of labor to off-farm activities.

A second-order Taylor-Series expansion of (1) in p and w provides a money measure of the welfare change at the household level resulting from changes in prices:

$$(2) \quad \Delta W = [z_p \quad z_w] \begin{bmatrix} \Delta p \\ \Delta w \end{bmatrix} + \frac{1}{2} [\Delta p \quad \Delta w] \begin{bmatrix} z_{pp} & z_{pw} \\ z_{wp} & z_{ww} \end{bmatrix} \begin{bmatrix} \Delta p \\ \Delta w \end{bmatrix},$$

The first term in (2) captures the first order effects of price changes. In this expression, $\Delta w = \frac{dw}{dp} \Delta p$, where $\frac{dw}{dp}$ is the Stolper-Samuelson impact of changes in p on w (Dixit and Norman 1980). Equation (2) contains the Deaton (1989) indicator of the welfare impact of commodity price changes, $z_p \Delta p = (\pi_p - e_p) \Delta p$, and a corresponding term for the household's net sales of labor outside its firm, $z_w \Delta w$. Each of these terms involves multiplying the net sales of the good (or factor) by its price change to obtain a first-order measure of the welfare impact of the change.

The second term in (2) takes into account three distinct second-order impacts. The first, $\frac{1}{2} \Delta p' z_{pp} \Delta p$, captures the effect of output price changes on households' net sales of commodities and captures the tendency for households' net sales to increase when prices rise. The second, $\frac{1}{2} \Delta w' z_{ww} \Delta w$, is the second-order impact of higher wage rates on the supply of labor to non-business activities. The third, $\frac{1}{2} [\Delta w' z_{wp} \Delta p + \Delta p' z_{pw} \Delta w]$, captures the symmetric interactions between changes in commodity prices and wage rates. To our knowledge, this third term has not previously been taken into account in measuring the impacts of price changes on poverty.

The first-order impacts of price and wage changes in equation (2) can be easily be evaluated using information on households' net sales of agricultural products and unskilled labor. The second-order impacts require assessments of the matrix of behavioral coefficients for each household:

$$\begin{bmatrix} z_{pp} & z_{pw} \\ z_{wp} & z_{ww} \end{bmatrix} = \begin{bmatrix} \pi_{pp} & \pi_{pw} \\ \pi_{wp} & \pi_{ww} \end{bmatrix} - \begin{bmatrix} e_{pp} & e_{pw} \\ e_{wp} & e_{ww} \end{bmatrix}$$

In order to ensure consistency between the household models and the global CGE model, these coefficients are estimated using the same demand and production specification, but taking into account each household's specific attributes. The project team has implemented this approach in papers such as Ivanic and Martin (2017), Laborde and Martin (2018) and Ivanic and Martin (2014).

On the demand side, the non-homothetic Constant Difference of Elasticities (CDE) demand system is used to specify the e_{pp} matrix consistently with the economy-wide model. Each household's behavior is represented using its own initial expenditure shares and the estimated substitution parameters from the GTAP database. Following Hanoch (1975), the matrix of compensated elasticities ϵ are as follows:

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$$(3) \quad \epsilon_{i,j} = (\alpha_i + \alpha_j - s^T \alpha) s_j, \text{ when } i \neq j, \text{ and}$$

$$(4) \quad \epsilon_{i,j} = (\alpha_i + \alpha_j - s^T \alpha) s_j - \frac{\alpha_i}{s_i}, \text{ when } i = j,$$

where α is the vector of CDE substitution parameters and s is the vector of consumption shares. The consumption shares s for each household come from the household surveys.

Using the elasticities obtained from (3) and (4), we express second-order changes in the cost of utility for each household as follows:

$$(5) \quad \Delta e = \left[\begin{matrix} \mathbf{p} \\ \mathbf{w} \end{matrix} \right] \circ \left[\begin{matrix} \mathbf{x} \\ \mathbf{l} \end{matrix} \right]^T \left[\begin{matrix} \hat{\mathbf{p}} \\ \hat{\mathbf{w}} \end{matrix} \right] + \frac{1}{2} [\hat{\mathbf{p}} \circ \mathbf{p} \circ \mathbf{x}]^T \epsilon \hat{\mathbf{p}},$$

where the \circ operator denotes element-wise multiplication, i.e. a Hadamard product; $\mathbf{p} \circ \mathbf{x}$ is a vector of expenditure values; $\hat{\mathbf{p}}$ is a vector of percentage changes in prices; w is the wage rate for unskilled labor; l is the household's total supply of labor (including to its own farm firm); and ϵ is a matrix of compensated demand elasticities (labor supply elasticities are omitted because total household labor supply is assumed fixed).

The first term on the right side of (5) is a first-order approximation to the change in expenditure needed to achieve a given level of utility, while the second term takes into account the ability of consumers to adjust their consumption patterns in response to changes in prices in the long run. The household's compensated labor supply elasticity is assumed to be zero, and hence $e_{ww} \equiv e_{pw} \equiv 0$. This is done both for simplicity and for consistency with the national models, in which we do not allow for changes in household labor supply.

On the production side, the second order matrix $\begin{bmatrix} \pi_{pp} & \pi_{pw} \\ \pi_{wp} & \pi_{ww} \end{bmatrix}$ is estimated following the production structure used in the economy-wide model.

To obtain the medium-run responses, we represent the production side of the economy with a Jones-type model in which labor is the only factor mobile between sectors. This allows us to solve for the variables that are endogenous to the household—and particularly commodity output levels and the supply of labor off-farm—as functions of variables that are exogenous or predetermined for the household (particularly output and input prices, and factor endowments) to obtain a production elasticity matrix μ specific to each household.

To obtain the long-run responses, all factors are assumed to be completely mobile except land and natural resources, which can be transformed between activities with an elasticity of transformation of one as in the GTAP model. Each household has its own specific endowments imputed from its observed outputs and sales of labor off-farm.

Changes in household firm profits are defined as follows:

$$(6) \quad \Delta \pi = \left[\begin{matrix} \mathbf{p} \\ \mathbf{w} \end{matrix} \right] \circ \left[\begin{matrix} \mathbf{x} \\ -\mathbf{y} \end{matrix} \right]^T \left[\begin{matrix} \hat{\mathbf{p}} \\ \hat{\mathbf{w}} \end{matrix} \right] + \frac{1}{2} \left[\begin{matrix} \hat{\mathbf{p}} \\ \hat{\mathbf{w}} \end{matrix} \right] \circ \left[\begin{matrix} \mathbf{p} \\ \mathbf{w} \end{matrix} \right] \circ \left[\begin{matrix} \mathbf{x} \\ -\mathbf{y} \end{matrix} \right]^T \mu \left[\begin{matrix} \hat{\mathbf{p}} \\ \hat{\mathbf{w}} \end{matrix} \right],$$

where $\begin{bmatrix} \mathbf{p} \\ \mathbf{w} \end{bmatrix}$ represents a stacked vector of output prices \mathbf{p} and the wage rate for unskilled labor, w ; $\begin{bmatrix} \mathbf{x} \\ -\mathbf{y} \end{bmatrix}$ represents a stacked vector of output quantities \mathbf{x} and the labor input demanded by the farm firm $-\mathbf{y}$; and μ is a matrix of own and cross-price elasticities for the farm firm's output supply and labor demand.

Compared to recent advancements in methodology on measuring the distributional effects of trade liberalization (Artuc, Porto and Rijkers 2017), the advantage of this framework lies in the fact that

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1) it captures not only the first order but also the second order effects of trade reform and 2) it does not assume perfect transmission of tariffs to domestic prices. The inclusion of second-order impacts is important because it allows the efficiency impacts of reform to be taken into account as well as the purely distributional impacts.

3. Provide a literature review & explain study's intellectual merit.

Despite the vast and ever-growing body of economic literature that explores the distributional and poverty impacts of trade and trade policies, information and studies on the incidence of trade policies are scarce. The few existing studies make use of household survey data available for some countries to account for the heterogeneity in consumption expenditures and earnings of households across the income distribution and assess the incidence of trade policies. Furman, Russ and Shambaugh (2017), for instance, show that U.S. tariffs tend to be regressive, i.e. higher, on average, on goods where low income households concentrate their expenditure. They estimate that the burden of U.S. tariffs on the bottom 10th percentile of households is more than five times higher than at the top 10th percentile. In contrast, Nicita, Olarreaga and Porto (2014) estimate that for their sample of six Sub-Saharan Africa countries, existing trade policies benefit poor households more than rich households. This is because protectionist measures in place increase the price of goods sold by the poor, compensating for the decline in purchasing powers and the strong Stolper-Samuelson effect which tends to favor skilled labor. Systematic, cross-country studies on the incidence of trade policies do not exist. In this context, the database to be developed in the first phase of the project will be unique in its topic addressed as well as its country coverage.

The existing literature does not capture a systematic relationship between trade and poverty/inequality. The question whether trade is beneficial or not for reducing poverty and inequality remains an empirical one, and the overall impact is found to be highly context specific. The outcome depends on the degree and nature of the trade shocks, the industry and the location in which these occur, the skill composition of workers in liberalized industries, broader economic conditions and the presence of market failures. The analytical tool to be developed in the second phase of the project will allow us to tackle the context specific nature of the relationship between trade and poverty/inequality and apply it to the ex-ante estimation of the impact of changes in trade policies in different client countries.

For the purposes of this review, we classify the channels through which international trade affects poverty and inequality into the following three categories: growth, earnings and expenditure.

The growth channel

A widely accepted presumption is that trade can be a source of economic growth, and as a result, an engine of development and poverty reduction (Winters 2004; Winters and Martuscelli 2014). Trade allows countries to specialize in the production of goods and services which they can produce most efficiently and leads to better allocation of limited resources. Trade can contribute to the rise of economies of scale and scope and pro-competitive effects. Trade can also facilitate productivity growth, the cross-border transfer of technologies, encourage innovation and help EMDEs close their observed productivity gaps (Amiti and Konings 2007; Bustos 2011; Bloom, Draca and Van Reenen 2016). Despite the positive relationship identified between trade and growth (Dollar 1992; Frankel and Romer 1999), this empirical literature has faced numerous criticisms regarding the measurement of the degree of openness of an economy, the establishment of the causality between trade and growth, and not being able to separate the impact of trade policies from the impact of other policies that also influence growth (Rodríguez and Rodrik 2000). Furthermore, others argue that after controlling for institutions and geography, the pro-growth effects of trade become statistically insignificant or furthermore, have a negative growth effect (Rodrik, Subramanian and Trebbi 2004). Freund and Bolaky (2008), for instance, find that a 1% increase in trade is associated with more than a 0.5 percent rise in per-capita income in flexible economies that facilitate firm entry, but has no positive income effects in more rigid economies. The main conclusion from literature is that the degree to which trade is beneficial for growth depends strongly not only on existing economic

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conditions (the rule of law, business regulations, human capital, infrastructure) but also on the flexibility of economies in being able to adapt to the opportunities created by trade.

The earnings channel

There is a large economic literature that examines the impact of trade on inequality through the income channel. Many argue that the traditional Heckscher-Ohlin trade theory and the Stolper-Samuelson effect perform poorly in explaining the widening wage gap between skilled and unskilled workers in EMDEs (Goldberg and Pavcnik 2007; Goldberg and Pavcnik 2016; Pavcnik 2017). The integration of these countries in the world trading system and their comparative advantage in exporting goods intensive in unskilled labor should have boosted the wages of unskilled relative to that of skilled labor. Most studies, however, find that trade liberalization not only raised wage inequality (Attanasio, Goldberg and Pavcnik 2004) but also contributed to rising within-group wage inequality (Menezes-Filho, Muendler and Ramey 2008). Existing evidence also shows that residual wage inequality - that not explained by observable worker characteristics such as age, education and occupation - is large and contributes significantly to rising wage inequality.

Trade policy changes can have differential effects on the income and employment of workers depending on the extent to which that market is exposed to import competition and export opportunities. Trade can result in greater competition in import competing sectors and if these are intensive in unskilled labor, put a downward pressure on the wages of the unskilled and even result in loss of employment in these sectors (Autor, Dorn and Hanson 2013; Pierce and Schott 2016). The industry as well as the firm affiliation of workers matter as bigger and more productive firms are more likely to engage in international trade and are able to adjust to trade shocks (Melitz and Redding, 2015). If trade favors the adoption of skill-biased technologies, it could exacerbate the downward pressure on the wages of unskilled workers (Burststein, Cravino and Vogel 2013). Finally, market failures (e.g. if the poor are in remote locations and disconnected from markets; have limited access to finance; labor market frictions), may mean that the gains from trade do not reach the poorest segments of the population.

The expenditure channel

It is well known empirical fact that the structure of household expenditure varies by income. Household survey data reveals that the poorest households in low income countries spend on average more than two-thirds of their income on food (Banerjee and Duflo 2007), compared to about half in EMDEs. On the other hand, the share of income spent on durable goods and services rises with income. Given that international trade plays an important role in influencing the price of goods and services, this heterogeneity in the composition of household spending across the income distribution plays a crucial role in defining the winners and losers from changes in trade policies. Nigai (2016), for instance, shows that using the assumption of a representative consumer compared to his structural model that features heterogeneous consumers with non-homothetic preferences tends to overestimate the gains from trade of the poor and underestimate the gains for the rich.

Compared to the large literature that examines the distributional impact of trade through the earnings channel, there are only a few existing studies that capture heterogeneity of household expenditure. Highlighting the importance of heterogeneity in expenditures for consumers, Fajgelbaum and Khandelwal (2016) use a non-homothetic demand system and argue that gains from trade are biased toward the poor. This is mostly because the poor tend to spend more on goods which are more traded, and because these goods also have lower price elasticities. They estimate that for their sample of 40 countries, trade accounts for two-thirds of the purchasing power of households in the lowest income decile compared to less than one-third for households in the upper income decile. In the same vein, Porto (2006) uses a multi-household, small open economy model of the Dixit and Norman (1980) type and estimates that MERCOSUR has benefitted the average Argentinian household, however poor households gained more from trade reform than middle-income households, while gains at the top of the income distribution were positive but not statistically significant.

On the other extreme, using the same general approach as in Porto (2006), Nicita (2009) moves away from the small open economy assumption and explicitly considers the prices of non-tradables to find

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that NAFTA had a regressive effect on households in Mexico and increased the wage gap between skilled and unskilled workers. Faber and Fally (2017) find that gain from trade are regressive mostly because larger, more productive firms endogenously sort into catering to the taste of wealthier households which in turn tend to benefit more. Atkin, Faber and Gonzalez-Navarro (2018) extend this analysis to account for foreign entry in the retail industry in Mexico and find that the large welfare gains for the average household are explained by an important reduction in the cost of living. Although all income groups are found to benefit, the gains of the richest income group are 50 percent larger than for the poorest.

In an attempt to combine the growth and distributional effects of trade, Artuc, Porto and Rijkers (2017) estimate that across a sample of 54 developing countries, the gains from trade add up to 1.8 percent of real household expenditure. However, they also find evidence of a trade-off between the income gains and the inequality costs for 46 of these countries, which arise because trade tends to exacerbate income inequality.

The analytical tool to be developed in the second phase of the project fits into the line of literature that use a Dixit and Norman (1980) style money measure of the welfare impacts of trade policies (Porto 2006; Nicita 2009; Artuc, Porto and Rijkers 2017) as well as in the empirical literature that combines computable general equilibrium modeling with microsimulation techniques to estimate the first and second order distributional effects of trade policies (Ivanic and Martin 2017; Laborde and Martin 2018; Ivanic and Martin 2014).

4. Describe Implementation arrangements. Identify timeline, key team members and their roles. If the partnership is involved, describe the partnership arrangements, and the respective responsibility of Bank units and partners.

The project will bring together survey specialists from the Development Data Group (DECDG), experts on trade and food policies, modelers from DEC, MTI and the International Food Policy Research Institute (IFPRI), as well as World Bank operational staff.

Csilla Lakatos (DECPG - Economist) will serve as the Task Team Leader of the project. In collaboration with DECDG and Israel Osorio-Rodarte (MTI - Consultant), she will be responsible with the development of the correspondence between the COICOP and HS classifications, matching the household survey data with trade distortions, and will work closely with IFPRI in the design of the modeling tool and simulations. She will also work with the Pakistan PTIPP team and Nadia Rocha (MTI - Senior Economist), the TTL, to operationalize the project. Maryla Maliszewska (MTI - Senior Economist) and Bob Rijkers (DECRG - Senior Economist) will act as advisors.

Olivier Dupriez (DECDG - Lead Statistician) and Tefera Bekela Degefu (DECDG - Data Analyst) will collaborate on issues regarding the harmonization of the household surveys to the Classification of Individual Consumption by Purpose (COICOP) and the correspondence to be developed between COICOP and the Harmonized System (HS) classification. Initial consultations have already resulted in fruitful discussions about the work already done on the harmonization of household surveys and the potential to further disaggregation in order to fit the purposes of this project.

The project will be carried out in close collaboration with IFPRI. The main IFPRI counterparts will be Will Martin (Senior Research Fellow, current President of the International Association of Agricultural Economists and former DECRG Manager) and David Laborde (Senior Research Fellow and Theme Leader on Macroeconomics and Trade). The initial stage of consultations has been finalized and we agreed on the scope of the project, the harmonization of the data and the details of the modeling tool to be developed. Will Martin and David Laborde will be in charge with developing the analytical tool designed to analyze the poverty and distribution impacts of changes in trade policies.

The project is expected to commence right after the announcement of the KCP decisions and foreseen to last for a projected 2.5 years. The data collection, cleaning and the matching of the

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household surveys with data on trade distortions will be carried out between October 1, 2018 and October 1, 2019. The development of the modeling tool will start at the inception of the project but will be refined based on data availability between June 2019 and June 2020. The project will most likely be piloted for the Pakistan PTIPP in FY2020. We envisage an important dissemination component in partnership with IFPRI towards the completion of the project.

5. Outline the expected outputs (working paper, publication, computational/analytical tools, datasets, etc.) and specify the expected date of delivery for each output.

The project is expected to generate the following outputs:

- A comprehensive cross-country database on the incidence of trade distortions that will be made available to the public;
- An analytical tool to consider the first and second order poverty and inequality effects of changes in trade policies;
- A working paper documenting the construction of the database with descriptive analytics on the contents of the data;
- A working paper documenting the development of the model and applying it to a relevant policy question;
- Deliverable to the Government of Pakistan within P157197 Trade Strategy Development that analyzes the incidence of Pakistan's existing tariff structure and provides estimates of the poverty and inequality effects of envisioned trade policy reforms.

The outcomes of the project will be the following:

- The database on the incidence of existing trade distortions will be used as an advocacy and communication tool in discussions with World Bank client countries to induce change in trade policies that will minimize the adverse impacts on the poor;
- Driving an informed dialogue between operations and Bank clients on the poverty and inequality costs of potential trade policy reforms;
- Providing technical capacity to World Bank clients on how to quantify the incidence of trade policy measures.

6. Describe the beneficiary of the research, the relevance for policy in developing (or transition) countries and for WBG Operations. Outline dissemination plans, including plans to reach policy makers.

The database developed in the first pillar of this project can serve as a powerful communication and advocacy tool in the World Bank's work with client countries to reduce the potential disproportional burden of existing trade barriers on the poor. The database will be unique in its coverage of countries and the topic addressed.

The modeling tool developed under the second pillar will be of great operational relevance by providing a simple and convenient starting point for the measurement of the poverty and inequality implications of trade policy reform.

7. Describe the capacity building components, including the collaboration with local partners, researchers from developing countries.

The project will be piloted in the ongoing World Bank Pakistan Trade and Investment Policy Program (PTIPP) under P157197 Trade Strategy Development lead by MTI. This deliverable will be an important part of the dialogue with the Pakistani authorities aimed to highlight the importance of taking into account the poverty and inequality implications of planned trade reforms. Csilla Lakatos has been part of this team and got the approval of Nadia Rocha (TTL) to pilot the data and model of this project.

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In addition, the project will be carried out in close collaboration with IFPRI, a research policy center working to provide solutions that sustainably reduce poverty and end hunger and malnutrition. The project will tap into wide-ranging IFPRI operational work on food and trade policies and expand the scope of collaboration possibilities to the African Growth and Development Policy Modeling Consortium (AGRODEP), an initiative aimed at positioning African experts to take a leadership role in the study of strategic development questions and policy debate facing African countries led by IFPRI.

8. Document evidence of the consultation process with relevant research and operations units. E.g. consultation conducted, comments received, & how comments were addressed. TTLs should also describe plans to maintain operational and research consultation.

The proposal went through extensive consultations with internal and external experts.

In a first step, we conferred with Olivier Dupriez (Lead Statistician) and Tefera Bekela Degefu (Data Analyst) from the Development Data Group. During two meetings, we had fruitful discussions on DECDG's existing work to harmonize the surveys to the COICOP classification. Olivier and Tefera were open to the possibility of refining the classification of the harmonized surveys to better fit the purposes of this project and potentially disaggregate agricultural and food products. In addition, they already assisted us with providing the full set of surveys that differentiate between goods and services purchased by households from home produced/gifted ones.

We have also consulted with Bob Rijkers and Erhan Artuc from the Development Research Group and Guido Porto (UNLP) on their ongoing work program on the trade-off between income gains and inequality costs of trade policy. They are currently working on finalizing this project also funded by the KCP program that will result in a published paper (Artuc, Porto and Rijkers 2017) and potentially, a modeling tool to be made available online. Our discussions have revealed that the main criticism they get when presenting this work pertains to one of the following issues: they only account for the first order effects of trade policy changes and they assume a full-passthrough of changes in tariffs to domestic prices. As discussed above, this proposal addresses both of these criticisms. In addition, this project will also include a wider set of households surveys - 107+ compared to the 54 used in Artuc, Porto and Rijkers (2017) and will cover a wider set of trade distortions in food and agricultural products from the Ag-Incentives database.

We have also met with Maryla Maliszewska (GMTRI) who is in charge with developing MTI's research program on poverty and inequality impacts of trade. She highlighted the fact that given the overlap between the program on the Global Income Distribution Dynamics (GIDD) microsimulation model and the analytical scope of this project, we could explore how to benefit from synergies between the two projects.

The work program was discussed in detail during two meetings with IFPRI counterparts Will Martin and David Laborde. They have shared their extensive experience on working with household surveys and microsimulation models in assessing the poverty effects of trade policy changes. They also highlighted the importance of including a wider set of trade policy measures affecting agricultural and food sectors) which is now included in this proposal.

In terms of ongoing operational and research consultation, Csilla Lakatos is part of the World Bank working group on poverty and inequality effects of trade policy currently composed of Ambar Narayan (GPVGE), Carlos Rodriguez Castellan (GPV04), Maryla Maliszewska (GMTRI), Israel Osorio-Rodarte (MTI), Bob Rijkers (DECTI), Erhan Artuc (DECTI) and Paolo Bastos (DECTI). The group aims to meet periodically to discuss internal work on these issues.

9. If this is an impact evaluation study, please answer the following:

- a. Why is this project a research project and not an impact evaluation project?
- b. Is the project linked to the Bank lending project? If so, provide the project number.

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- c. Will this project produce new knowledge or fill the gap of current literatures?

This is not an impact evaluation study.

Disbursement Projection

From Date	To Date	Amount
10/1/2018	6/31/2019	95,000
7/1/2019	6/31/2020	205,000
7/1/2020	12/31/2020	100,000

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