Responses to Reviewer #2 on International Trade and Polarization in the Labor Market DP2011-48-2

I'm thankful the referee for her/his comments. Here are my responses to the three concerns raised.

1. The introduction gives an unbalanced survey of the literature. The author claims that the literature on 'the job polarization phenomenon to be nearly synonymous with Skilled biased Technological change'. This is not true. Feenstra (2010), Offshoring in the global economy, MIT, or Krugman (2008) Trade and Wages, Reconsidered, Brookings Papers on Economic Activity, give a much more nuanced discussion of the literature, and point out that evidence on this topic is too limited to draw firm conclusions (see also the discussion between Leamer and Krugman in the Journal of International Literature, around 2000). The introduction should not only be toned down somewhat as to the originality of the contribution, but also should give a more up to date account of the literature on this topic. Now it remains unclear what the contribution of this paper is, compared to the more recent (and extensive) literature.

I was aware of Feenstra and Hanson's work (I taught it in the classroom), Krugman's and Leamer's. I wasn't aware of Feenstra's Ohlin lectures, which I have now read. The literature on trade and relative wage is indeed vast (I have also contributed), so is that on off-shoring and wages, including earlier works of Jones and other scholars.

When I wrote the Introduction, I thought about incorporating some of it but decided against it, 'cause it would expand the introduction further, would only help to dilute the focus on *polarization* in the labor market, which is theme of the paper. Any literature is a continuum. One has to to start from somewhere and that point moves over time. My point of departure was/is polarization in the labor market – papers/works that *explicitly* dealt with this issue – with all other literature, however related, such as trade and relative wages, kept behind. (This is not to deny that I have a lot of respect for the literature on trade and relative wages.)

The reviewer talks of "more recent (and extensive) literature." It is not clear whether what is being referred to is on (a) polarization and trade/offshoring or (b) other aspects of labor market and trade/offshoring.

Compared to the existing literature, the contribution of this paper lies exploring the mechanisms/channels through which an increase in the relative price of the high-skill intensive products or off-shoring of particular kinds of tasks may contribute towards polarization in the labor market. These are outlined below.¹

International Trade

The central question posed in the paper is how an increase in the relative price of high-skill labor intensive good may contribute to polarization in employment.

The paper's analysis begins with a variation of the standard two-sector, two-factor model, which assumes that medium and low skill labor are perfect substitutes of each other. As the relative price of the high-skill-labor intensive product rises, high-skill wage rises, and both middle- and low-skill wages fall in the same proportion. The ratio of high-skill to medium-skill wage increases. Assuming that high-skill education is imparted by high-skill workers and the cost of high-skill education is proportional to high-skill wage, the excess return on high-skill education over medium skill increases with the ratio of high-skill to medium-skill wage. As the latter increases, so does the excess return on high-skill education. There is a movement away from medium-skill education to high-skill education. The employment share of high-skill labor increases.

The return on middle-skill education depends on middle- and low-skill wages, and, the cost of acquiring middle-skill education. As long as middle-skill and low-skill labor are perfect substitutes (more generally highly substitutable) in production, there will be little change in the relative wage between the two, implying that the absolute difference between the two wage rates will shrink as the relative price of the high-skill labor intensive good rises. If medium-skill education is imparted by high-skill labor also (while one unit of high-skill labor can teach/train more individuals seeking medium skill than those seeking high skill) and the cost of medium-skill education rises with high-skill wage, there will be an unambiguous decline the return from medium-skill education compared to no education. It will imply a movement away from medium skill to low-skill jobs. The employment share of low-skill labor increases too. Medium-skill jobs are squeezed from both sides.

It is shown next that as long as medium- and low-skill labor are highly substitutable, the polarization holds even in a sector-specific framework, not just in a 2×2 framework.

The next general point is that high substitutability between medium- and low-skill labor is not critical. An increase in the relative price of high-skill labor intensive exports would lead to polarization if the non-traded sector produces services that are highly unskilled-labor intensive.

In sum, two factors behind how an increase in the relative price of high-skill labor intensive exports may contribute to polarization are uncovered:

¹The same appears in my response to Referee #1.

- (a) high-substitutability of between medium- and low-skill labor and/or
- (b) the non-traded sector producing highly unskilled labor services.

Off-Shoring

While the results are similar to Grossman/Rossi-Hansberg, this is true only in spirit - especially to their "productivity effect." There are substantial differences and generalizations however.

- (a) Grossman and Rossi-Hansberg did not analyze the effect of off-shoring on employment composition or polarization, – which is the focus of this paper. Assuming fixed labor supplies they considered how off-shoring would affect wages. Accordingly I have a new effect, which I have called a **variable labor supply effect**, quite different from the excess labor supply implied by the productivity effect.
- (b) In this paper I have looked at wages *and* employment variation of *three* grades of labor, whereas they considered wages for two types of labor only and that too assuming fixed labor supplies.

Results/Predictions Relative to the Existing Literature
With regard to off-shoring I have already stated the comparative results.

Furthermore, as stated on page 5 of the paper, a main result of Blanchard and Willmann, a related paper, is that a decline in the middle-range jobs (polarization) is a result of a decrease in trade costs of middle-skill range sectors.

The prediction of this paper is sharply different: namely, polarization results from an increase in the relative price of the most skill intensive traded sector.

2. Related to the above, Section 2 is uninformative. The presentation of the literature surveyed in this section uses a lot of 'hand\mathbb{\text{waving'}}, and is not very informative on the models, that are only briefly mentioned, with respect to similarities or differences in relation to the current model. Grossmann/Rossi\mathbb{\text{Hansberg}}, implicitly do discuss the composition of jobs, as they discuss excess labor supply effects caused by off\mathbb{\text{Tshoring}}.

This section is brief because there aren't many analytical papers that deal *directly* with trade and/or off-shoring and polarization in the labor market. To what extent and detail a paper, or which papers may be discussed in relation to the related literature is a matter of judgment. My personal view is that if I were to refer all papers that may be thought as related – and discuss the modeling as well – the end-product would be more about what is there outside the paper than inside; a paper's identity (focus) will be essentially lost, unless it is meant to be partly or fully a survey article.

3. I find the intuition in section 3, and the set@up of the model unnecessarily complicated. The model in essence is a higher@dimensional HO@model consisting of two commodities and three factors of production. It is well@known that in higher dimensions standard results (at best) hold on an average basis. In the case of 3 factors and 2 commodities, standard Stolper@Samuelson effects continue to hold (a price increase of a good will lead to a rise in real return of some factor), but Rybczynski effects do no longer hold as changes in factor endowments, necessarily lead to changes in the returns and change factor intensities. The introduction of special assumptions in this model, such as made in the specific factors model, allows for tractable results. My guess is that a reformulation of the model in terms of a higher dimension HO model might help readers to understand the fundamentals of this model. Also comparing the results with (an elaborate) specific factors model could help understanding what are the main causes of the results (by providing a bench@mark).

The Intuition laid out in section 3 is a result of my thinking and suggestions by other readers on earlier versions of this paper. The reviewer thinks it is unnecessarily complicated. My fear is that if I simplify it or cast it as a special case of higher-dimension issues, I would be either hand-waving on the paper itself or fail to directly bring out the intuition.

To cast the whole paper in a framework of higher dimensions will make it a very different paper with a different emphasis. I would prefer to keep the focus of the paper on polarization in the labor market: that is, on different mechanisms through which more liberalized trade and/or off-shoring of particular kinds may contribute to polarization in the labor market.