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Foreign Trade and Men and Women's Employment and Earnings in Germany and Japan

Abstract. This paper provides an empirical analysis of the effects of foreign trade expansion on men and women's employment and earnings in Germany and Japan since the early-1970s. The analysis is prompted by trade studies identifying manufacturing industries appearing most vulnerable to foreign trade, industries in which German and Japanese women are disproportionately represented. Evidence is found that foreign trade expansion had a more adverse effect on women's than men's manufacturing employment in Japan and a more equal effect in Germany. In spite of this, demand shifted away from women's employment in Germany after the early-1970s, for both the manufacturing sector as a whole and for manufacturing industries with high female percentages of employment. No such demand shifts occurred in Japan. In the face of these differences in demand and of remarkable similarity in female labor supply, male-female wage differences narrowed in Germany and widened in Japan, for both manufacturing and non-agricultural employees. These diverging patterns of male-female wage differences are explained by the more marginal basis on which Japanese women were integrated into the workforce, reflected in the character of women's part-time and temporary employment as well as union representation. To some extent, the more marginal basis on which Japanese women were integrated into the workforce resulted from the explicit policies of Japanese firms, referred to as "Operation Scale-Down" (genryo keiei). In Germany, too, the character of women's integration into the workforce appears to result in part from explicit policies undertaken by The Federation of German Trade Unions (Deutscher Gewerkshaftsbund), the largest German federation of unions.

Introduction

A great deal of research addresses the question of whether there was in recent years an increased bias in labor demand toward skilled workers. Such a bias is argued to result from expanding foreign trade, particularly trade with developing economies, and from skills-biased technological change. The skills bias of labor demand is also argued to be an important determinant of increased earnings inequality, which was particularly dramatic in the U.S. in recent years (Cf. Burtless, 1995: 800-801 for a recent survey of this literature). Much less attention has been paid to the gender bias of labor demand resulting from these forces. Yet several studies find that women in the advanced capitalist

economies tend to be concentrated in industries particularly vulnerable to foreign trade (Schumacher, 1984: 342-343; Wood, 1991a: 22; Lee and Schmitt, 1996: 14). Following up on these studies, this paper analyzes the impact of trade expansion on men and women's relative employment and earnings in Germany[1] and Japan, with particular emphasis on the manufacturing sector.

In recent decades, trade expansion is estimated to have a more adverse effect on women's than men's employment in Japan and a more equal effect in Germany. However, the gender bias of trade is insufficient to explain the observed trends in male-female wage differences in Germany and Japan, which narrowed in the former and widened in the latter since the mid-1970s. For demand shifted away from women's employment in Germany, for both the manufacturing sector as a whole and for manufacturing industries with high female percentages of employment. No such demand shifts occurred in Japan. Neither do labor supply factors appear helpful in accounting for male-female wage differences. For there were nearly identical increases in the female percentage of labor force participants in Germany and Japan since the mid-1970s, and the female percentage of college graduates was also similar. More institutional factors are considered, including women's part-time and temporary employment and representation in unions. These institutional factors appear to play a more important role in accounting for the diverging patterns of male-female wage differences than do shifts in either labor demand or supply.

This emphasis on labor market institutions is in the spirit of Freeman and Katz's recent work on the causes of changes in overall earnings inequality. Regarding the widely-varying patterns of earnings inequality changes among countries, Freeman and Katz write,

[1] All data refer to the former West Germany or, in most recent years, to the regions of the former West

"Supply and demand factors...cannot by themselves explain all of the differing changes in inequality among advanced countries. Why? Because supply and demand moved in roughly similar ways in these countries" (Freeman and Katz, 1994: 43). The authors argue that the large increases in overall earnings inequality in the U.S. and United Kingdom in the 1980s resulted from the declining strength of unions, a decline not offset by the presence of other centralized wage setting institutions (such as a high minimum wage or the extension of collective bargaining agreements to non-unionized workers) (Freeman and Katz, 1994: 53).

Foreign Trade and Men and Women's Employment

We are in the midst of a second wave of globalization, the first beginning in the latter half of the nineteenth century, peaking with the First World War, and falling off thereafter. As measured by the growth of world foreign direct investment and foreign trade in relation to world GDP, the current wave of globalization took off around the early-1970s (Milberg, 1997). With the liberalization and expansion of international markets came increasing concern with their effects. Of central importance for workers in the advanced economies are the effects of expanding foreign trade, placing these workers in increasingly direct competition with workers from around the world. A sense of the growing importance of foreign trade is provided by measures of import penetration, defined as imports as a percentage of domestic consumption. Levels of import penetration were considerably higher in Germany than Japan, suggesting the former's greater reliance

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Germany.

on trade. More than that, since 1970 import penetration grew more rapidly in Germany than Japan. From 1970 to 1991, import penetration from all trade increased from 13.4 to 27.1 percent in Germany and from 3.8 to 6.0 percent in Japan. Import penetration from non-OECD trade, predominately developing economies, increased from 1.9 to 4.6 percent in Germany and from 1.3 to 2.5 percent in Japan over these same years (see Data Notes).

There is controversy over whether foreign trade expansion is an important cause of overall job loss in the advanced economies but little controversy that some industries are affected more than others. Wood summarizes studies identifying industries in the advanced economies most strongly affected by trade with the developing economies. He writes, "All the studies have identified the same sets of winning and losing sectors. The losers include food processing, wood products, textiles and clothing, and leather goods and footwear. These losses have been largely offset, however, by increased employment in the machinery and chemicals industries" (Wood, 1991a: 22). In both Germany and Japan, women tend to be concentrated in those industries identified as trade losers. For Germany, the top three industries by relative female representation (defined as the female percentage of employment in a manufacturing industry indexed relative to the manufacturing sector as a whole) are 1. wearing apparel, 2. leather products and footwear, 3. and textiles. Food, beverages and tobacco ranks a close fifth, just behind professional goods. That is, four of the top five industries by relative female representation are identified by Wood as trade losers. Measures of average annual relative female representation from 1970 to 1991 range from 150.75 to 286.43 for the top five industries noted, with 100 indicating average female representation in any single year. For the industries Wood identifies as trade winners, German women are underrepresented in machinery and equipment, though not in

chemical products. The picture in Japan is very similar. For Japan, the top four industries by relative female representation are, respectively, 1. wearing apparel, 2. textiles, 3. food, beverages and tobacco, and 4. leather products and footwear, all of which are identified by Wood as trade losers. Measures of average annual relative female representation from 1970 to 1991 range from 152.27 to 247.57 for these four industries. Regarding trade winners, Japanese women are underrepresented in both machinery and equipment and chemical products (these measures are shown below in tables 11 and 12, column 7).

As suggested by the above rankings, one of the striking aspects of women's representation among manufacturing industries is the cross-country similarity. The Pearson correlation coefficient between measures of relative female representation in Germany and Japan is 0.92, significant at the one-percent level. (The Spearman correlation coefficient is nearly as high, 0.86, and also significant at the one-percent level. Hereafter, a result referred to as "significant" indicates statistical significance at the five-percent level, unless indicated otherwise.) That is, women are distributed among manufacturing industries in a nearly identical manner in Germany and Japan. This seems remarkable given the historical, geographical, and cultural differences between the two countries and suggests that more general factors may be at work in determining patterns of gender segregation across manufacturing industries. Though no complete explanation is attempted here, these more general factors appear related to the broader historical processes of capitalist development. In the early stages of development, manufacturing output was typically dominated by the production of textiles, apparel, and foodstuffs, industries in which women continue to be disproportionately represented. In Japan, the dominance of these industries held until the 1930s (Macpherson, 1987: 18). Until the rise

the factory system, the production of textiles, apparel, and foodstuffs typically occurred through the putting out system of household production, often as a form of by-employment for farming families (Macpherson, 1987: 17). In both the putting out and early factory systems, women and children made up large shares of the manufacturing workforce, particularly in the textiles, apparel, and foodstuffs industries. This held across the largest advanced capitalist economies, including England, France, Germany, the U.S., and Japan (Tilly, 1993). Successful development was associated with the growth of the domestic capital goods sector and heavy industry, which predominately employed men. With the rise of heavy industry and the decline of child labor, women tended to remain in those industries in which they had long been employed.

Trade theory can motivate the question of whether expanding foreign trade might cause women in the advanced capitalist countries to experience disproportionate employment losses. The Heckscher-Ohlin principle, at its most basic, holds that a country has a comparative trade advantage in goods that are intensive in the factor of production for which the country is relatively well endowed. Germany and Japan, being among the world's most advanced economies, are better endowed with capital than labor, particularly compared with developing economies, and thus have a comparative advantage in capital-intensive goods (OECD, 1994: 94). For both Germany and Japan, female percentages of employment tend to be somewhat higher in labor intensive manufacturing industries. Pearson correlation coefficients between relative female representation and relative labor intensity (employment divided by output in a manufacturing industry indexed relative to the manufacturing sector as a whole) are 0.43 for Germany and 0.46 for Japan, based on

annual averages from 1970 to 1991.[2] Though neither coefficient is large, both are positive and significant at the ten-percent level. If Germany and Japan have comparative advantages in capital-intensive goods, as the Heckscher-Ohlin principle holds, then there might be relative demand shifts away from labor-intensive industries within both countries in the face of expanding foreign trade. Such relative demand shifts create a tendency for relative employment shifts away from labor-intensive industries. In the absence of sufficiently offsetting factors, expanding foreign trade would thus cause women's employment to decline relative to men's.

It is controversial, though, whether comparative trade advantages affect the numbers of those employed. Trade theorists typically emphasize relative price shifts rather than relative demand shifts in addressing the effect of foreign trade on earnings inequality, as is noted by Belman and Lee. They write that "standard trade models assume balanced trade and full employment overall, which is why their predictions center on changes in commodity and factor prices (which have to be flexible in order for markets to 'clear' and thus maintain full employment with balanced trade)" (Belman and Lee, 1996: 71). To which the authors counter as follows:

> In reality, prices and wages are not so flexible, and imbalanced trade and unemployment frequently coexist. Under these circumstances, trade can have a variety of effects not contemplated in conventional models. For example, the impact of trade can be felt more on employment than on wages. Trade deficits, especially if concentrated in high-wage sectors such as manufacturing, can have an especially depressing effect on both employment and the average wages of those employed (Belman and Lee, 1996: 71).

[2] Through the remainder of this paper, only results for Pearson coefficient correlations are presented. However, Spearman coefficients were derived for all correlations as well, and results were not substantially altered.

Belman and Lee's view, that trade may affect employment more directly than wages, motivates the use of factor content analysis.

Factor Content Analysis

Factor content analysis uses input-output data to estimate the effect of foreign trade expansion on employment (Schumacher, 1984; Lee and Schmitt, 1996). This analysis provides evidence that foreign trade expansion had a more negative effect on women's than men's employment in Japan and a more equal effect in Germany. That is, foreign trade created a decided demand shift away from women's employment in Japan but little or no such shift in Germany.

In standard fashion, the input-output model is described as follows:

(1) $(I - A)^{-1} T = O$

where I is an identity matrix of the nth order, A is a matrix of intermediate input coefficients, T is a vector of demand from trade expansion, O is a vector of direct and indirect outputs required to produce T, and n is the number of industries. Following Sachs and Shatz (1994: 26-28):

(2) $T = [x^{91} - (x^{91} (X^{70}/X^{91})] - [m^{91} - (m^{91} (M^{70}/M^{91})]$

where superscripts reflect the data year, x is a vector of exports, m is a vector of imports, and where X and M are vectors of export and import propensity, respectively - that is, exports and imports in an industry divided by the domestic production of that industry. Put in words, T is the difference between actual export and import levels in 1991 and what these levels would have been in 1991 if the exports and imports bore the same relationship

to domestic production as in 1970. The vector of direct and indirect outputs, *O*, is converted to the number of total, men, and women workers with labor coefficients, as follows:

(3) $L_j = l_j O_j \qquad (j = 1,...,n)$

(4) $L_j^m = l_j^m O_j \qquad (j = 1,...,n)$

(5) $L_j^w = l_j^w O_j \qquad (j = 1,...,n)$

where l_j, l_j^m, and l_j^w are the number of total, men, and women workers, respectively, in an industry divided by the domestic production of that industry. In other words, the standard assumption is made that employment changes for men and women in an industry are proportionate to the actual distribution of men and women within an industry. For the sum of all industries, the number of total, men, and women workers estimated to be affected by foreign trade expansion are thus:

(6) $L = \sum_{j=1}^{n} l_j O_j$

(7) $L^m = \sum_{j=1}^{n} l_j^m O_j$

(8) $L^w = \sum_{j=1}^{n} l_j^w O_j$

Factor content analysis assumes constant returns to scale and constant composition of intermediate inputs and also ignores possible price effects. This potential problem is addressed, to some extent, by looking at two base years instead of one, using input-output data for 1975 and 1990 for Japan and 1978 and 1990 for Germany (for Germany, 1978 is the earliest year for these data are available in the OECD Input-Output Database, 1995.)

Input-output data is matched with labor coefficients and men and women's employment data for these years, providing representations of the economic structures of Germany and Japan. As with most trade studies, calculations are based solely on the trade of manufactured goods (Wood, 1991a: 21).

For German manufacturing as a whole, women's employment is estimated to be more adversely affected than men's, but not by much. Based on the 1990 economic structure, the estimated percent changes in employment resulting from trade expansion from 1970 to 1991 were -9.48 for women and -7.07 for men, in relation to actual employment in 1970. Both percent changes are larger based on the 1978 economic structure, partly a result of labor productivity increases, but the proportions between men and women are similar (table 1). For Japan, the estimated percent changes in employment resulting from trade expansion were -4.97 for women and 2.64 for men, in relation to actual employment in 1970. Based on the 1975 economic structure, trade expansion is estimated to have a similar negative effect on women's employment and a considerably more positive effect on men's employment (table 2).

Looking at total (men and women's) employment, trade expansion is estimated to have had a negative employment effect in Germany and a positive employment effect in Japan (tables 1 and 2, column 3). This result is sensitive, though, to the years over which one chooses to measure trade expansion. Of particular importance in this regard are measures of X and M, export and import propensity, which drive measures of T and which can be cyclically sensitive. Looking at years 1975 to 1990 rather than 1970 to 1991, trade expansion is estimated to have a very similar negative on total employment effect in both Germany and Japan. Based on the 1990 economic structure, the estimated percent

changes in total employment resulting from trade expansion from 1975 to 1990 were -5.66 for Germany and -5.14 for Japan, in relation to actual employment in 1975. Nevertheless, the result remains that trade expansion had a more negative effect on women's than men's employment in Japan and a more equal effect in Germany. For Germany, the estimated percent changes in employment resulting from trade expansion from 1975 to 1990 were nearly equal for women and men, at -5.37 and -5.78 percent, respectively. For Japan, the estimated percent changes in employment resulting from trade expansion over these years were considerably more negative for women than men, at -8.53 and -3.73 percent, respectively. Results are similar based on the 1975/78 economic structure. Regarding relative demand shifts for men and women's employment, of primary importance for this paper, results are thus robust with respect to changes in the years over which one measures trade expansion.

Factor content analysis is also conducted looking solely at trade with non-OECD countries, largely developing countries. This provides a test of as well as support for Wood's hypothesis that "North-North trade in manufactures, unlike North-South trade, appears to be gender-neutral" (Wood, 1991b: 170). Wood describes trade between developed and developing economies, or North-South trade, and its effects on women workers as follows:

> It is widely believed that female workers have been affected much more than male workers by the rapid expansion of developing country manufactured exports to developed countries over the past three decades. Women constitute a high proportion of the labour force in some conspicuous parts of developing-country export-oriented manufacturing (clothing and electronic products, and export processing zones). In developed economies, women are over-represented in the sectors on which manufactured imports from developing countries have been concentrated, and under-represented in the manufacturing sectors which export to

developing countries. Similarly, in developed countries women are overrepresented among trade-displaced workers (Wood, 1991b: 168).

Based on the 1990 economic structure for Germany, the estimated percent changes in employment resulting from non-OECD trade expansion from 1970 to 1991 were -4.94 for women and -2.02 for men, in relation to actual employment in 1970 (table 3). That is, trade with non-OECD countries had a more negative effect on women's employment relative to men's than did all trade, providing support for Wood's hypothesis. Non-OECD trade accounted for 52.1 percent of the employment change for women resulting from all trade compared with 28.5 percent of the employment change for men from all trade. For non-OECD trade for Japan, the estimated percent changes in employment resulting from trade expansion from 1970 to 1991 were -3.61 for women and 0.35 for men, in relation to actual employment in 1970 (table 4). Non-OECD trade accounted for 72.3 percent of the employment change for women resulting from all trade compared with 13.2 percent of the employment change for men from all trade.[3] That is, a disproportionate share of the estimated employment loss for women from all foreign trade resulted from trade with developed economies (disproportionate in relation to both countries' trade with non-OECD countries as a share of all trade).[4] Non-OECD trade accounted for a higher proportion of women's employment change from all trade in Japan than Germany, consistent with former's greater dependence on trade with developing economies. For

[3] For Germany based on the 1978 economic structure, the measures are 54.5 percent for women and 27.2 percent for men, with results derived from tables 1 and 3, rows (1) and (4). For Japan based on the 1975 economic structure, the measures are 86.6 percent for women and 22.9 percent for men based on the 1975 economic structure, with results derived from tables 2 and 4, rows (1) and (4).

[4] For Germany in 1991, 16.8 percent of total manufactured imports and 19.0 percent of total manufactured exports are from trade with non-OECD countries. For Japan, 42.7 percent of total manufactured imports and 44.1 percent of total manufactured exports are from trade with non-OECD countries (see Data Notes).

both imports and exports in 1991, for example, Japan's trade with non-OECD countries as a share of all trade was roughly two-and-one-half times greater than Germany's.

Industries with a positive estimated change in employment from trade in both base years can be regarded as "trade winners." For Germany's trade with all countries, there are four such industries: food, beverages, and tobacco; paper, paper products, and printing; industrial chemicals; and non-ferrous metals (table 5, with trade winners indicated in bold letters). For Japan's trade with all countries, there are ten such industries: industrial chemicals; drugs and medicines; non-ferrous metals; non-electrical machinery; office and computing equipment, electrical apparatus not elsewhere classified; radio, television, and communication equipment; shipbuilding and repairing; motor vehicles; and professional goods (table 6). Only two industries are trade winners in both Germany and Japan, industrial chemicals and non-ferrous metals. Since women are distributed in a nearly identical manner among manufacturing industries in the two countries, the different effects of trade on men and women's employment in Germany and Japan are driven by these differences in industry trade performance. Trade with non-OECD countries reveals a similar number but somewhat different mix of trade winners (tables 7 and 8).

The importance of foreign trade expansion on employment is estimated by the correlation across industries between the percent change in actual employment from 1970 to 1991 and the estimated percent change in employment from trade from 1970 to 1991. For Germany, the correlation coefficients between these measures are practically zero (-0.05) based on both 1978 and 1990 economic structures, providing no evidence that foreign trade expansion was an important determinant of actual changes in employment

(from tables 5, with correlations between columns 2 and 4 for the 1978 economic structure and between columns 2 and 7 for the 1990 economic structure.)

For Japan, correlation coefficients are quite high, 0.69 and 0.66 based on the 1975 and 1990 economic structures, with both significant at the one-percent level (from table 6). This provides evidence that foreign trade expansion was a significant determinant of actual employment changes. Yet the greater effect on employment of non-trade factors is suggested by comparing actual employment changes with estimated changes in employment resulting from trade for the manufacturing sector as a whole. Actual employment increased by 9.18 percent from 1970 to 1991 while the estimated change in employment from trade over these years was only 3.46 and 0.05 percent, based on the 1975 and 1990 economic structures, respectively (table 6, last row of columns 2, 4, and 7). It is also worth considering the estimated effects of trade expansion from 1975 to 1990. Over these years, trade expansion is estimated to have had a negative effect on total manufacturing employment in Japan, though actual manufacturing employment increased by 7.87 percent. Last, the manufacturing industries in which female percentages are high experienced above average employment losses in Germany but no such losses in Japan. This too suggests the limited importance of foreign trade in accounting for observed changes in employment.

Intra-Industry Trade and Men and Women's Employment

The main conclusion from factor content analysis is that foreign trade expansion had a more negative effect on women's than men's employment in Japan and a more equal

effect in Germany. This conclusion is supported by examining correlations between trade and employment variables. At the same time, these correlations suggest that the differences between the countries in this regard are partly attributable to the greater importance of intra-industry trade in Germany.

Pearson correlation coefficients are constructed between the following variables: import penetration (imports as a percentage of domestic consumption); export orientation (exports as a percentage of domestic consumption); logarithmic growth of the import penetration; logarithmic growth of export orientation;[5] labor intensity (employment divided by output); and, last, female representation (female percentage of employment). Correlations are based on annual average data from 1970 to 1991 for individual manufacturing industries indexed relative to the sum of manufacturing industries (tables 9 and 10).

For both Germany and Japan, there are significant positive correlations between relative import penetration and relative female representation, with correlation coefficients of 0.58 and 0.55 for Germany and Japan, respectively. That is, female percentages are high in industries with high levels of imports relative to domestic production. Import penetration is a one-sided measure, however, and it is worth considering whether female percentages are high, at the same time, in industries with high relative export orientation. This could offset the potentially adverse employment effects of being concentrated in industries with high import penetration. However, the correlation between relative female

[5] The growth of import penetration and export orientation are defined as the logarithmic growth rate between average values for 1970 through 1972 and 1989 through 1991. This method is used since changes in the annual growth rates of these variables are driven predominately by changes in domestic production rather than by changes in exports and imports.

representation and relative export orientation is negative, though not significant, for both Germany and Japan.

Levels of import penetration and export orientation are based on annual averages over a span of two decades. These measures embody the effects of trade prior to as well as during these decades. The growth of import penetration and export orientation are probably more relevant in understanding present and future employment effects of expanding trade. For Germany, the correlation coefficient between relative import penetration growth and relative female representation is positive and significant, at 0.52. For Japan, the coefficient is also positive and significant, at 0.57. For Germany, the correlation coefficient between relative export orientation growth and relative female representation is positive and significant at the ten-percent level, at 0.44. That is, female percentages in Germany tend to be higher in industries with relatively high import penetration growth and relatively high export orientation growth. These results are consistent with factor content analysis, in which women and men's manufacturing employment in Germany are estimated to be affected by trade expansion in a fairly similar manner. For Japan, the correlation coefficient between relative export orientation growth and relative female representation is -0.63, significant at the one-percent level. Combined with the significant positive correlation between relative import penetration growth and relative female representation, these results too are consistent with factor content analysis, providing evidence that trade expansion had a more adverse effect on women's than men's employment in Japan.

In Germany, industries with high import penetration growth also have, to a significant extent, high relative export orientation growth, reflecting the growing

importance of intra-industry trade in Germany. The correlation coefficient between relative import penetration growth and relative export orientation growth is 0.74, significant at the one-percent level. In Japan, the correlation coefficient is practically zero. This difference between Germany and Japan holds in a similar manner for correlations between levels of relative import penetration and relative export orientation, suggesting that the difference is a long-standing one. These results are entirely consistent with more conventional measures of intra-industry trade[6] and indicate that to a large and increasing extent, Germany tends to import the same types of goods it exports. Japan's imports and exports, in contrast, are considerably more diversified. Lincoln describes the anomalous nature of Japanese trade patterns as follows: "Broad international comparisons of intra-industry trade consistently show Japan to be at or near the bottom, whereas a fairly high level of such trade characterizes the United States and other nations. This fact is a critical element in understanding why Japan has aroused so much ire among its trading partners" (Lincoln, 1990: 39). Lincoln argues that Japan's lesser reliance on intra-industry trade results from favoring the domestic production of manufactures, in turn related to Japan's status as a late developer (Lincoln, 1990: 92-94).

[6] Providing a common definition of the measure, The OECD Jobs Study writes that one subtracts "the absolute value of the trade balance by commodity ($|X_i - M_i|$) from total trade in that commodity ($X_i + M_i$), and express the result as a percentage of total trade. Thus, if a country only exports (or only imports) a commodity, the value of the index will be zero. If the country's exports of the commodity are identically equal to its imports, the value of the index will be 100" (OECD, 1994: 113). At the three-digit STIC level for manufacturing industries, the measures for Germany are 60 in 1970 and 67 in 1985; the measures for Japan are not only much lower but also declining, from 32 in 1970 to 26 in 1985 (Lincoln, 1990: 47). At the three-digit STIC level for all trade for the whole economy, the measures for Germany are 54 for 1970 and 68 for 1991; the measures for Japan are much lower though increasing, from 20 in 1970 to 31 in 1991. At the three-digit STIC level for non-OECD trade for the whole economy, the measures for Germany are 15 for 1970 and 29 for 1991; the measures for Japan are 7 for 1970 and 24 for 1991 (OECD, 1994: 114). Cf. Lincoln, 1990: 165-170 for a discussion of various measures of intra-industry trade.

Of particular relevance for this study is that the higher the level of intra-industry trade, the lesser the possibilities for different trade effects on men and women's employment. To take the most extreme example, if a country imported exactly what it exported, having balanced trade within each individual industry, then there would be no estimated effects on employment of any kind, including different effects on men and women's employment. In practice, demand shifts from trade may nonetheless favor men or women's employment. It may be, for instance, that large firms within an industry have more favorable trade performance than small firms and that women are disproportionately represented in small firms. More detailed industry data might also reveal such differences.

Trade and Non-Trade Factors in Demand Shifts for Women's Employment

The empirical work in this paper focuses on the effects of foreign trade expansion on men and women's manufacturing employment. It is important, though, to compare these results with actual changes in men and women's manufacturing employment, providing a sense of the relative importance of trade versus non-trade factors. The most direct way to determine relative demand shifts for men and women's employment is to look at changes in the female percentage of employment. For Germany, the measure declines fairly steadily from 1957 to 1983, after which it levels off to 28 percent. For Japan, the change in the female percentage of employment is less trended than in Germany and moves in a pro-cyclical manner. This is particularly apparent after the early-1970s. There is a the large drop in the measure from 1973 to 1978 and a persistent increase from 1978 to 1990, from 28 to 33 percent (graph 1). In short, since the late-1970s, demand

conditions favored women relative to men in Japan, while the opposite was true in Germany.

The greater relative demand shift away from women's employment in Germany is also seen at the level of individual manufacturing industries. From 1970 to 1991, female-intensive industries experienced disproportionate employment losses in Germany but no such losses in Japan. For Germany, the correlation coefficient between relative female representation and relative employment growth is -0.75, a striking result that is significant at the one-percent level (table 9). For Japan, the coefficient is 0.03, practically zero (table 10). The industry level data from which the correlation coefficients at the 16-industry level are derived indicate that the strong negative correlation in Germany is driven in large part by employment losses in three industries: textiles; wearing apparel; and leather products and footwear (table 11). These industries rank in the top three by relative female representation and the bottom three by relative employment growth. The average annual decline of relative employment growth from 1970 to 1991 was -3.26 percent for textiles, -4.18 percent for wearing apparel, and -4.49 percent for leather products and footwear. These industries experienced three to four times more employment loss than non-metallic mineral products, which had the next greatest employment loss.

It has been established that the demand for women's employment relative to men's declined in German manufacturing in recent decades, for both manufacturing as a whole and for manufacturing industries that employed high percentages of women. For Japan, in contrast, demand for women's employment relative to men's increased for manufacturing as a whole since the late-1970s, and there was not greater job loss in manufacturing industries that employed high percentages of women. This leaves the question of what

caused the relative demand shift away from women's employment in the German manufacturing sector. There is evidence that the effects of both labor displacing technical change and compositional shifts in investment had a more adverse effect on German than Japanese women's manufacturing employment. Labor productivity growth was relatively high in those German manufacturing industries in which female percentages were high, while this was not so for Japan (the correlation coefficient between relative labor productivity growth and relative female representation was 0.41 in Germany, with 0.11 significance, and -0.28 in Japan, with 0.29 significance). While investment growth was relatively low in both German and Japanese manufacturing industries in which female percentages were high, the relation was stronger and statistically significant in Germany (the correlation coefficient between relative investment growth and relative female representation was -0.64 in Germany, with 0.01 significance, and only -0.18 in Japan, with 0.50 significance). It is worth noting that the changes in the composition of domestic investment and patterns of labor productivity growth among manufacturing industries may result not only from domestic but also from international forces. Compositional shifts in domestic investment may be driven by patterns of foreign investment from or into Germany and Japan; labor displacing technical change may be defensive, an attempt to maintain competitiveness in the face of the expanding foreign trade. But these effects, especially the latter, are difficult to isolate and thus to weigh. Wood (1994) argues for the importance of defensive labor displacing technical change while Burtless (1995: 811-813) expresses skepticism.

Male-Female Wage Differences and Supply and Demand Shifts for Labor

An emphasis on relative demand shifts underlies the two most prevalent explanations of changes in overall earnings inequality, skills biased technical change (e.g., Bhagwati and Kosters, 1994), and North-South trade expansion (e.g., Wood, 1994). Shifts in the supply of college educated workers are emphasized by other studies (e.g., Katz, Loveman, and Blanchflower, 1995: 48). The same logic can be applied to evaluate changes in male-female wage differences, by looking at these changes in the context of changes in the demand for and supply of male and female labor.

For both manufacturing and non-agricultural employees, male-female wage differences narrowed in Germany after the mid-1970s and widened in Japan. For Germany (manufacturing plus mining and utilities), the measure increased fairly steadily over the post-War years, though the rate of increase slowed after 1975. For Japan, the measure increased quite rapidly after 1958 and then did a turnabout in 1973 and declined fairly steadily thereafter, though jumping up in 1991 (graph 2). One finds the same patterns with ratios based on the unweighted average of female-to-male hourly earnings ratios for 16 manufacturing industries, which abstract from changes in the number of employees per industry. That is, the diverging patterns of female-to-male hourly earnings are the result of changes within industries, not of compositional shifts of German women into higher-paying industries and of Japanese women into lower-paying industries. This is also supported by the very similar patterns of divergence at the more aggregate level, for female-to-male hourly earnings ratios for non-agricultural workers (Blau and Kahn, 1995:

106. Cf. Hill, 1996: 153-157 and Kumazawa, 1996: 160 for similar ratios for the economy as a whole).

The divergence in male-female wage differences occurred in the face of remarkable similarities in female labor supply. For Germany, the female percentage of labor force participants increased from 37 percent in 1973 to 41 percent in 1990; for Japan, the measure increased from 38 percent in 1973 to 41 percent in 1990 (see Data Notes).[7] Germany and Japan are also similar in terms of the percentage of women among the college-educated. The female percentage of tertiary-level graduates for Germany was 32.2 percent in 1971, 45.4 percent in 1981, and 46.5 percent in 1990; for Japan, the female percentage of tertiary-level graduates was 39.8 percent in 1970, 43.3 percent in 1981, and 44.2 percent in 1991 (UNESCO, 1976, 1984, 1994).

As with women's labor force participation, the female percentage of non-agricultural employees (excluding self-employed and unpaid family workers) also increased steadily in both Germany and Japan. From 1975 to 1990, this measure increased from 37 to 41 percent in Germany and from 32 to 38 percent in Japan (see Data Notes). The diverging pattern of male-female wage differences, narrowing in Germany and widening in Japan, is similar for both manufacturing and non-agricultural employees (with data on non-agricultural employees from Blau and Kahn, 1995: 106). For Germany, that is, demand conditions for non-agricultural employees favored women relative to men while the opposite held for manufacturing employees. That the patterns of male-female wage differences between manufacturing and non-agricultural employees should be so

similar in Germany in spite of this difference in demand conditions provides further evidence that demand and supply shifts are not the most important determinants of changes in men and women's wage differences in the period considered.

In terms of demand for women's employment in manufacturing, conditions were less favorable for German than Japanese women. Demand shifted away from women's employment in Germany after the early-1970s, for both the manufacturing sector as a whole and for manufacturing industries with high female percentages of employment. No such demand shifts occurred in Japan. It does not seem unreasonable to think that sizable shifts in relative labor supply and demand would have a predictable effect on relative earnings. Yet if supply and demand shifts were the most important determinants of changes in earnings in the case at hand, the observed demand shifts are the opposite of what one would expect. Given that women make up large shares of the labor force in Japan and Germany, the world's second and third largest economies, this study provides a significant counter-example to the supply and demand shift approaches that dominate discussions of changes in earnings inequality. The effects of supply and demand shifts appear overwhelmed by institutional factors, particularly women's representation in unions and the different character of women's part-time and temporary employment in Germany and Japan. These institutional factors reflect the more marginal basis on which Japanese women were integrated into the labor force and are briefly discussed in the paper's conclusion.

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[7] Female labor force participation rates are higher in Japan than Germany (Brinton, 1993: 3), but female percentage of labor force participants is the more relevant measure regarding a comparison of male-female wage differences between countries, as the latter abstracts from the country-specific total (male plus female) labor force participation rate.

One obvious counter to the emphasis on institutional determinants of wages is that it ignores other determinants, including measures of human capital (though the share of women among college graduates was considered). Yet for Japanese women, these latter determinants appear of less importance than one might expect. A study by Tachibanaki uses analysis-of-variance (ANOVA) estimation procedures to decompose the effects of six factors on overall wage differences for the years 1958 to 1978: sex, experience, size of firm, age, occupation, and education. Tachibanaki concludes that sex was by far most important factor in accounting for overall wage differences (Tachibanaki, 1982: 448). Tachibanaki reports that sex accounted for an estimated 44.7 percent of wage differences in 1978. The remaining factors in order of importance were experience, accounting for an estimated 20.1 percent of wage differences, size of firm at 15.6 percent, age at 13.3 percent, occupation at 5.0 percent, and education at 1.4 percent (Tachibanaki, 1982: 451). That sex was two-and-a-half times more important than experience in a seniority-based earnings system such as Japan's is remarkable. In more recent work, Tachibanaki updated this analysis. For 1985, the most recent year reported, Tachibanaki notes that sex accounted for an estimated 37.4 percent of overall wage differences compared with experience next at 31.7 percent, age at 21.7 percent, size of firm at 5.3 percent, occupation at 2.5 percent, and education at 1.4 percent (Tachibanaki, 1996: 41). Though the importance of sex declined and importance of experience and age increased, sex remained the most important determinant of overall wage differences. Tachibanaki's study also indicates the persistence and even increased importance of seniority-based earnings in Japan.

Tachibanaki's work is supported by more recent anecdotal evidence regarding hourly wages for men and women by age groups, using 1989 data (Brinton, 1993: 47). For full-time male workers, wages increased strongly and steadily with age up to the 45 to 49 age group, after which wages declined (sharply for the 55 to 59 and 60 to 64 age groups). For full-time female workers, in striking contrast, wages were flat for age groups 30 to 34 and above and were flat for part-time female workers for age groups 25 to 29 and above. This provides stark evidence of Japanese women's exclusion from the seniority-based earnings system, even for those women working full time. More fundamentally, a number of studies argue that the viability of the predominately male core employment system in Japan - characterized by lifetime employment guarantees, seniority-based earnings and promotion, and membership in an enterprise union - depends on the exclusion of much of the labor force, particularly of women (e.g., Tachibanaki, 1987: 669; Ono, 1990: 87-88; Hashimoto, 1993: 141). That is, the marginal nature of Japanese women's employment is a fundamental characteristic of Japan's labor-management relations and even economic competitiveness. This is described by Lam as follows:

> [O]ffering women true equal opportunities would imply redistribution of the promotion changes between men and women. This would disrupt the job security and long-service promotion expectations of the male employees which are part of the long-standing implicit understanding between management and the male employees. This customary expectation has been the major force generating high commitment, high output effort and willingness to co-operate in furthering the aims of the company. The benefits that management derives from these long-standing practices are considerable, and it is not at all clear that Japanese companies are willing to give them up (Lam, 1993: 218).

Conclusion

In both German and Japanese manufacturing, women are concentrated in industries that several studies identify as trade losers. Only in Germany, though, were there persistent demand shifts away from women's employment in manufacturing. The female percentage of manufacturing employees in Germany declined at a fairly steady rate since the late-1950s. The measure was more cyclically driven in Japan, declining in the early-1970s and increasing strongly after the late-1970s. In Germany, there were also significant employment shifts away from manufacturing industries with high female percentages but no such shifts in Japan. Different methods were used to determine whether the observed shifts in German manufacturing away from women's employment resulted from expanding foreign trade. No strong supporting evidence was found. For Japan, in contrast, evidence was found of the adverse effects of foreign trade on women's employment in manufacturing. Such effects were more than offset by non-trade factors, as evidenced by the rise in the female percentage of manufacturing employees after the late-1970s.

Women's labor supply conditions were much alike between Germany and Japan. The female percentage of labor force participants increased in a nearly identical manner in both countries, and the share of women among college graduates was also similar. In the face of these supply and demand shifts, women's hourly earning relative to men's increased in Germany and declined in Japan, for non-agricultural and manufacturing employees alike. This divergence was not the result of compositional shifts of German women into higher paying and Japanese women into lower paying manufacturing industries, for the same pattern held within industries. The diverging patterns of male-

female wage differences between Germany and Japan cannot be accounted for by supply and demand shifts for men and women employees. More important was the marginal basis on which Japanese women were integrated into the workforce, reflected in the character of women's part-time and temporary employment as well as union representation.

In both Germany and Japan, about 30 percent of female employees worked as part-timers (OECD, 1991: 46). However, 40 percent of German part-timers (those working more than 21 hours per week) are considered "regular part-time workers," with similar wages, benefits, and job security as regular full-time employees (Kolinsky, 1989: 178, 180-181; OECD, 1991: 44, 48). In Japan, part-timers are classified not by data collection agencies but by employers (Hashimoto, 1993:141). As of the mid-1980s, an estimated one-fourth of Japanese part-timers actually work full-time (Saso, 1990: 145). Japanese employers have a strong monetary incentive to classify workers as part-timers, who are not part of the regular system of benefits and seniority-based earnings. Japanese part-time female employees over age 20 received only 60 to 70 percent of a regular female employee's wages, as well as far fewer benefits (Kawashima, 1987: 604; Houseman 1995: 257)

Temporary employees are typically paid a good deal less than regular employees. In Germany and Japan in recent years, one out ten employees worked on a temporary basis, with the proportion somewhat smaller for manufacturing employees. For Germany, 45.1 percent of temporaries were women in 1991, somewhat higher than the female percentage of employees. For Japan, 72.3 percent of temporaries were women, highest among the sixteen OECD countries for which such data are available (OECD, 1993: 24). Also significant is the age distribution of temporary employees. In Germany, the majority

of temporaries (58.3 percent) were in the 15 to 24 age group, whereas the majority of temporaries in Japan (58.0 percent) were in the 25 to 54 age group. This suggests the more truly temporary nature of temporary employment in Germany, which often serves as a stepping stone to permanent employment (OECD, 1993: 26).

The consideration of women's part-time and temporary employment provides evidence that women entry into the labor force was on a more marginal basis in Japan than Germany and is consistent with patterns of women's representation in unions (for union membership is typically limited to full-time workers with regular employment status). Women's union representation is measured by their union propensity, the female percentage of unionized employees divided by the female percentage of all employees. For Japanese manufacturing and non-agricultural employees, the measure declined steadily after the early-1970s. For German manufacturing and non-agricultural employees, the measure increased steadily after the early-1970s (see Data Notes). The diverging patterns of women's union representation is likely an important determinant of the diverging patterns of male-female wage differences (Freeman, 1994: 273, 280). Also relevant to widening male-female wage differences in Japan is the system of seniority-based earnings and promotion, from which part-time, temporary, and non-union employees are typically excluded. More generally, Japanese women's part-time and temporary employment and declining union representation provided a means to the end of maintaining the predominately-male core employment system. In the face pressure from increased international competition, slower growth, and a rapidly aging workforce, the inflexibility in hiring and firing and the costliness of the core employment system was accommodated by

the marginal nature of Japanese women's employment (Bank of Japan, 1994: 70; Houseman and Osawa, 1995: 16).

To a significant extent, the peripheral basis on which Japanese women were integrated into the workforce appears to result from the explicit policies of Japanese firms. During the oil crises of the 1970s, Japanese firms undertook what they referred to as "Operation Scale-Down" (genryo keiei) (Nakamura, 1995: 224). The main focus of Operation Scale-Down was cost reduction, which involved reducing the number of regular employees and making more extensive use of peripheral employees, particularly women working on a part-time basis. Regular employees were rarely fired outright, as firms relied on attrition through retirement, transferring employees to other firms, and making calls for so-called "voluntary" severance or retirement (sometimes through offers of larger severance or retirement allowances but, particularly for higher-paid senior employees, through management pressure) (Nakamura and Nitta, 1995: 339-340). The most significant changes occurred at large manufacturing firms, where low-wage part-time women filled formerly high-wage full-time positions. In describing operation scale-down and its effect on women, Nakamura writes, "Cutting back requires firms to economize as much as possible on labor-related expenses. Thus, firms switched from male to female employees and took on more low-wage part-time workers such as housewives....The most important consequence of Operation Scale-Down was the deterioration in employment conditions that it produced" (Nakamura, 1995: 224, 227). Also important were unions' policy of limiting membership, predominately of men, to a number consistent with uninterrupted employment (Kawashima, 1987: 600).

In Germany, too, the character of women's integration into the workforce appears to result in part from explicit policies. The Deutscher Gewerkshaftsbund (Federation of German Trade Unions) is the largest federation of unions in Germany and made special efforts since the early-1970s to improve women's employment conditions. In 1972, for example, the Deutscher Gewerkshaftsbund declared the Year of the Working Woman, initiating a large-scale drive to enroll women workers in unions (Cook, 1984: 70). It was also during the Year of the Working Woman that unions attacked the light-wage categories that accounted for much of gender wage inequality in Germany (Cook, Lorwin, and Daniels, 1992: 38).

On the face of it, it is reasonable to think that large relative supply and demand shifts for men and women employees would have a predictable effect on men and women's relative earnings. As noted, this logic underlies the more widely-held explanations of changes in earnings inequality. Yet there are plainly limits to such abstract conceptions of earnings. More purely historical factors come into play, factors that can completely offset the effects of supply and demand shifts.

Data Notes

Regarding factor content analysis, breakdowns by sex are derived from female percentages of employment in individual industries. In both countries, however, employment data by sex can be consistently dissaggregated only to the 16-industry level. As a result, duplicate measures of female percentage are used for some industries, as shown in columns 5 and 8 of tables 5 through 8.

Regarding correlation coefficients shown in tables 9 and 10, data are for 29 and 31 manufacturing industries for Germany and Japan, respectively, except for correlations involving female representation, which are based on data for 16 industries.

German and Japanese Government Data

All manufacturing data with male-female breakdowns are from original government data sources. This includes data on employment, labor force participation, unionization, wages, and hours worked (used to derive hourly wages). All data are annual unless noted otherwise.

Germany

Employment Data. Data are from the Bundesministerium fuer Arbeit und Sozialordnung's Arbeits- und Sozialstatistik. Hauptergebnisse (AS). Data are for employees only and do not include self-employed and unpaid family workers . Data include arbeiter, and angestellte, or wage and salaried employees. Beamte, or civil servants, are not included.

For dataup to and including 1976, all data points are for the end of September. From 1977 to 1991, data is for the end of June.

The continuous series for female percentage in manufacture, shown in Graph 1, is derived from the Statistisches Bundesamt's Statistisches Jahrbuch fuer die Bundesrepublik Deutschland (SJ) for years prior to 1958, with data for 1952 to 1954 from the 1955 SJ; data for 1955 and 1956 from the 1957 SJ; and data for 1957 from the 1958 SJ. The SJ data are based on the average of two monthly surveys 6 months apart, whereas the post-1957 data, from AS, are annual averages. The years 1958 to 1990 are drawn from AS.

Labor Force and Non-Agricultural Employment Data. Data are from AS, based on a combination of household and establishment surveys. The surveys are combined in the data source itself. (In the 1991 volume of Arbeits- und Sozialstatistik, the data are described as follows: "aufgrund der Ergebnisse der Volks- und Arbeitsstaettenzaehlung" (26); in the 1975 volume, the data are described similarly as follows: "auf Grund der Ergebnisse der Volks- u. Berufszaehlung" (26).) Data are annual averages.

Unionization Data. Unionization data are from SJ are based on membership at the end of September up to 1960 and the end of December thereafter.

Wage and Hours Worked Data. Data are from SJ. Data are for wage employees only ("arbeiter"), and thus differ from employment data, which also include salaried

employees ("angestellte"). Hourly earnings are derived from the ratio of average weekly earnings over the year to average weekly hours worked over the year.

Japan

Manufacturing Employment Data. Employment data (as well as all other data with male-female breakdowns) are from the Japanese Ministry of Labour's Yearbook of Labour Statistics (YLS), based on establishment surveys.

Data are for employees only and do not include self-employed and unpaid family workers. Employment data include "production and related employees" and "non-production employees" (the latter are referred to as "salaried employees" after 1967). While Japanese data include temporary and part-time employees, they do not include daily employees who worked less than eighteen days in each of the two calendar months prior to the survey. Japanese establishment survey data covers only firms with 30 or more employees.

Data are for the end of December. The Okinawa region is included in the data after 1973.

Labor Force and Non-Agricultural Employment Data. Data are based on household labor force surveys. Data are annual averages.

Unionization Data. Unionization data is based on membership at the end of June.

Wage and Hours Worked Data. Data are for production and non-production employees in firms with 30 or more employees, with hourly earnings are derived from the ratio of average monthly earnings over the year to average monthly hours worked over the year. Earnings include "contractual cash earnings" and "special cash payments," the latter of which includes "Retroactive payment of wages for past months as a result of a new agreement...payments such as summer and year-end bonuses which are paid for each period longer than 3 months, and allowances such as marriage allowance which are paid for unforeseen events...." (YLS 1982: 328)

OECD Data

Data are drawn from the STAN Industrial Database, 1995, the STAN Bilateral Trade Database, 1996, and the Input-Output Database, 1995, as noted under "Sources" in the graphs and tables. All data are annual.

Data on total employment (male plus female) are from the STAN Industrial Database. This includes data used to construct relative employment growth, relative labor intensity and, the labor coefficients used in the input-output analysis.

For the input-output analysis, trade data for all countries is from the STAN Industrial Database and trade data for non-OECD countries is from the STAN Bilateral Trade Database.

All nominal data from the STAN Industrial Database are converted to real terms by price deflators derived from the variables for value added and valued added in 1985 constant prices. For Germany, there was no data for valued added in constant prices for ISIC 354, petroleum and coal products. Thus, the deflator for ISIC 353, petroleum refineries, is substituted. (This is relevant at only the 29-industry level.) For Germany and

Japan, the deflators for ISIC 3825+383, office and computing machinery plus electrical machinery taken as a single industry, is the simple unweighted average of the deflators for ISIC 382 and 383, non-electrical machinery and electrical machinery, respectively (relevant at only the 16-industry level). For Germany and Japan for industries 3825 and 3829, office and computing machinery and machinery and equipment not elsewhere classified, respectively, the deflator for industry 382 is used (relevant at only the 29-industry level for Germany and 31-industry level for Japan).

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Table 1: Germany: Factor Content Analysis Results for Manufacturing as a Whole
Based on Expansion of All Trade from 1970-1991 with Breakdowns by Sex

	(1)	(2)	(3)
	Based on 1978 Economic Structure		
	Women	Men	Total
(1) Change in Employment from Trade	-424,394	-696,207	-1,120,601
(2) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-13.95	-9.84	-11.08
(3) Actual 1970 Employment	3,043,194	7,073,806	10,117,000
	Based on 1990 Economic Structure		
	Women	Men	Total
(4) Change in Employment from Trade	-288,616	-500,158	-788,775
(5) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-9.48	-7.07	-7.80
(6) Row (2) divided by row (5)	1.47	1.39	1.42

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
OECD: *DSTI ((Input-Output Database)* , 1995;
Bundesministerium fuer Arbeit und Sozialordnung: *Arbeits- und Sozialstatistik. Hauptergebnisse;*
German Council of Economic Experts.

Table 2: Japan: Factor Content Analysis Results for Manufacturing as a Whole
Based on Expansion of All Trade from 1970-1991 with Breakdowns by Sex

	(1)	(2)	(3)
	Based on 1975 Economic Structure		
	Women	Men	Total
(1) Change in Employment from Trade	-262,501	761,289	498,788
(2) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-5.37	7.99	3.46
(3) Actual 1970 Employment	4,892,533	9,531,208	14,423,741
	Based on 1990 Economic Structure		
	Women	Men	Total
(4) Change in Employment from Trade	-243,401	251,301	7,900
(5) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-4.97	2.64	0.05
(6) Row (2) divided by row (5)	1.08	3.03	63.14

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
OECD: *DSTI ((Input-Output Database)* , 1995;
Japan Ministry of Labour: *Yearbook of Labour Statistics;*
Bank of Japan: *Economic Statistics Annual* .

Table 3: Germany: Factor Content Analysis Results for Manufacturing as a Whole
Based on Expansion of Non-OECD Trade from 1970-1991 with Breakdowns by Sex

	(1)	(2)	(3)
	Based on 1978 Economic Structure		
	Women	Men	Total
(1) Change in Employment from Trade	-231,264	-189,318	-420,582
(2) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-7.60	-2.68	-4.16
(3) Actual 1970 Employment	3,043,194	7,073,806	10,117,000
	Based on 1990 Economic Structure		
	Women	Men	Total
(4) Change in Employment from Trade	-150,434	-142,557	-292,991
(5) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-4.94	-2.02	-2.90
(6) Row (2) divided by row (5)	1.54	1.33	1.44

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
OECD: *DSTI ((Input-Output Database)* , 1995;
OECD: *DSTI ((STAN Bilateral Trade Database)* , 1996;
Bundesministerium fuer Arbeit und Sozialordnung: *Arbeits- und Sozialstatistik. Hauptergebnisse;*
German Council of Economic Experts.

Table 4: Japan: Factor Content Analysis Results for Manufacturing as a Whole
Based on Expansion of Non-OECD Trade from 1970-1991 with Breakdowns by Sex

	(1)	(2)	(3)
	Based on 1975 Economic Structure		
	Women	Men	Total
(1) Change in Employment from Trade	-227,353	174,017	-53,336
(2) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-4.65	1.83	-0.37
(3) Actual 1970 Employment	4,892,533	9,531,208	14,423,741
	Based on 1990 Economic Structure		
	Women	Men	Total
(4) Change in Employment from Trade	-176,653	33,268	-143,384
(5) Percent Change in Employment from Trade (in relation to actual employment in 1970)	-3.61	0.35	-0.99
(6) Row (2) divided by row (5)	1.29	5.23	0.37

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
OECD: *DSTI ((Input-Output Database)* , 1995;
OECD: *DSTI ((STAN Bilateral Trade Database)* , 1996;
Bundesministerium fuer Arbeit und Sozialordnung: *Arbeits- und Sozialstatistik. Hauptergebnisse;*
German Council of Economic Experts.

Table 5: Germany: Factor Content Analysis Results at the Industry Level Based on Expansion of All Trade from 1970-1991 (19 Industries)

Industry		(1) Actual 1970 Employment	(2) Percent Change in Actual Employment 1970-1991	(3) Results Related to Factor Content Analysis Based on 1978 Economic Structure: Change in Employment From Trade	(4) Percent Change in Employment From Trade	(5) Percent Female	(6) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Change in Employment From Trade	(7) Percent Change in Employment From Trade	(8) Percent Female
31	**Food, beverages & tobacco**	984,000	-11.38	40,250	4.09	41.06	34,100	3.47	45.37
32	Textiles, apparel & leather	1,258,000	-59.22	-423,000	-33.62	65.84	-285,500	-22.69	62.90
33	Wood products & furniture	474,000	-12.03	-34,210	-7.22	18.87	-27,170	-5.73	19.43
34	**Paper, paper products & printing**	523,000	-10.90	26,030	4.98	33.63	18,200	3.48	33.07
351+352*	**Industrial chemicals**	656,229	-0.22	14,830	2.26	28.80	7,648	1.17	28.47
3522	Drugs & medicines	-----	-----	-----	-----	-----	-----	-----	-----
353+354	Petroleum & coal products	38,310	-33.06	-4,355	-11.37	28.80	-2,935	-7.66	28.47
355+356	Rubber & plastic products	336,461	30.05	-32,930	-9.79	28.80	-32,370	-9.62	28.47
36	Non-metallic mineral products	454,000	-29.30	-23,060	-5.08	19.28	-16,770	-3.69	20.71
371	Iron & steel	761,402	-37.93	-102,300	-13.44	13.08	-49,440	-6.49	14.65
372	**Non-ferrous metals**	185,598	12.82	77,370	41.69	13.08	65,110	35.08	14.65
381	Metal products	1,036,900	-4.85	-124,700	-12.03	11.10	-90,760	-8.75	13.24
382-3825	Non-electrical machinery	1,091,425	-2.17	-62,640	-5.74	15.57	-49,420	-4.53	15.92
3825	Office & computing machinery	87,545	8.78	-105,700	-120.74	31.06	-69,660	-79.57	29.70
383**	Electrical apparatus, nec	1,077,302	8.41	-60,140	-5.58	37.35	-53,410	-4.96	34.91
3832	Radio,TV&communication equipment	-----	-----	-----	-----	-----	-----	-----	-----
3841	Shipbuilding & repairing	77,857	-56.28	-282	-0.36	6.31	-156	-0.20	7.30
3842+44+49	Other transport	-----	-----	-----	-----	-----	-----	-----	-----
3843***	Motor vehicles	618,584	74.97	-187,800	-30.36	14.51	-143,300	-23.17	15.17
3845	Aircraft	47,503	67.81	-8,364	-17.61	19.11	-4,722	-9.94	16.44
385	Professional goods	302,884	-2.63	-59,050	-19.50	42.65	-52,900	-17.47	43.18
39	Other manufacturing	106,000	-28.30	-50,550	-47.69	34.83	-35,320	-33.32	32.84
	Total	10,117,000	-8.34	-1,120,601	-11.08	28.79	-788,775	-7.80	27.77

Notes: "-----" indicates industries for which input-output data is unavailable; * includes 3522; ** includes 3832; *** indicates employment data from *Arbeits- und Sozialstatistik* . Industries indicated in bold letters are those for which values in both columns (3) and (6) are positive, identifying industries that are "trade winners."

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
OECD: *DSTI ((Input-Output Database)* , 1995;
Bundesministerium fuer Arbeit und Sozialordnung: *Arbeits- und Sozialstatistik. Hauptergebnisse;*
German Council of Economic Experts.

Table 6: Japan: Factor Content Analysis Results at the Industry Level Based on Expansion of All Trade from 1970-1991 (20 Industries)

Industry		(1) Actual 1970 Employment	(2) Percent Change in Actual Employment 1970-1991	(3) Results Related to Factor Content Analysis Based on 1975 Economic Structure: Change in Employment From Trade	(4) Results Related to Factor Content Analysis Based on 1975 Economic Structure: Percent Change in Employment From Trade	(5) Results Related to Factor Content Analysis Based on 1975 Economic Structure: Percent Female	(6) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Change in Employment From Trade	(7) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Percent Change in Employment From Trade	(8) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Percent Female
31	Food, beverages & tobacco	1,410,170	25.18	-172,800	-12.25	46.20	-113,300	-8.03	51.91
32	Textiles, apparel & leather	2,219,780	-22.92	-789,100	-35.55	64.46	-504,200	-22.71	67.84
33	Wood products & furniture	1,015,850	-35.17	-159,100	-15.66	31.49	-81,720	-8.04	27.54
34	Paper, paper products & printing	994,818	22.33	-10,690	-1.07	21.72	-5,677	-0.57	25.80
351+352-3522	**Industrial chemicals**	508,967	-13.64	3,687	0.72	25.09	5,355	1.05	25.22
3522	**Drugs & medicines**	117,123	21.03	820	0.70	25.09	1,286	1.10	25.22
353+354	Petroleum & coal products	48,256	0.88	-669	-1.39	14.04	-744	-1.54	11.43
355+356	Rubber & plastic products	527,104	70.85	-20,610	-3.91	31.21	-8,813	-1.67	31.51
36	Non-metallic mineral products	694,000	-10.23	-12,420	-1.79	25.82	-6,697	-0.96	23.78
371	Iron & steel	519,438	-9.43	-4,850	-0.93	8.20	-18,050	-3.47	8.52
372	**Non-ferrous metals**	150,562	13.95	27,500	18.26	17.47	11,740	7.80	18.06
381	Metal products	1,191,150	4.96	-51,260	-4.30	20.49	-10,020	-0.84	24.83
382-3825	**Non-electrical machinery**	1,462,576	6.08	572,300	39.13	14.32	195,100	13.34	19.52
3825	**Office & computing machinery**	177,704	124.05	272,300	153.23	35.69	87,920	49.48	38.74
383-3832	**Electrical apparatus, nec**	836,475	34.62	231,100	27.63	35.69	109,300	13.07	38.74
3832	**Radio,TV&communication equipment**	917,055	55.97	120,700	13.16	35.69	49,330	5.38	38.74
3841	**Shipbuilding & repairing**	269,798	-61.09	13,330	4.94	11.94	10,570	3.92	15.30
3842+44+49	Other transport	-----	-----	-----	-----	-----	-----	-----	-----
3843	**Motor vehicles**	752,323	50.25	379,400	50.43	11.94	244,700	32.53	15.30
3845	Aircraft	-----	-----	-----	-----	-----	-----	-----	-----
385	**Professional goods**	261,663	14.11	158,100	60.42	38.74	60,640	23.17	36.73
39	Other manufacturing	348,929	-10.96	-58,950	-16.89	33.46	-18,820	-5.39	46.83
	Total	14,423,741	9.18	498,788	3.46	29.47	7,900	0.05	32.80

Notes: "-----" indicates industries for which 1970 employment data is unavailable and which were thus excluded from calculations;
Industries indicated in bold letters are those for which values in both columns (3) and (6) are positive, identifying industries that are "trade winners."

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
OECD: *DSTI ((Input-Output Database)* , 1995;
Japan Ministry of Labour: *Yearbook of Labour Statistics;*
Bank of Japan: *Economic Statistics Annual* .

Table 7: Germany: Factor Content Analysis Results at the Industry Level Based on Expansion of Non-OECD Trade from 1970-1991 (19 Industries)

Industry		(1) Actual 1970 Employment	(2) Percent Change in Actual Employment 1970-1991	(3) Results Related to Factor Content Analysis Based on 1978 Economic Structure: Change in Employment From Trade	(4) Percent Change in Employment From Trade	(5) Percent Female	(6) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Change in Employment From Trade	(7) Percent Change in Employment From Trade	(8) Percent Female
31	**Food, beverages & tobacco**	984,000	-11.38	30,480	3.10	41.06	25,560	2.60	45.37
32	Textiles, apparel & leather	1,258,000	-59.22	-295,800	-23.51	65.84	-198,800	-15.80	62.90
33	Wood products & furniture	474,000	-12.03	-18,500	-3.90	18.87	-14,770	-3.12	19.43
34	Paper, paper products & printing	523,000	-10.90	-2,813	-0.54	33.63	-2,601	-0.50	33.07
351+352*	Industrial chemicals	656,229	-0.22	-3,951	-0.60	28.80	-6,149	-0.94	28.47
3522	Drugs & medicines	-----	-----	-----	-----	-----	-----	-----	-----
353+354	Petroleum & coal products	38,310	-33.06	-723	-1.89	28.80	-479	-1.25	28.47
355+356	Rubber & plastic products	336,461	30.05	-19,930	-5.92	28.80	-17,470	-5.19	28.47
36	Non-metallic mineral products	454,000	-29.30	-4,707	-1.04	19.28	-3,261	-0.72	20.71
371	Iron & steel	761,402	-37.93	-20,190	-2.65	13.08	-11,500	-1.51	14.65
372	**Non-ferrous metals**	185,598	12.82	30,890	16.64	13.08	26,470	14.26	14.65
381	Metal products	1,036,900	-4.85	-24,100	-2.32	11.10	-18,830	-1.82	13.24
382-3825	**Non-electrical machinery**	1,091,425	-2.17	32,800	3.01	15.57	23,140	2.12	15.92
3825	Office & computing machinery	87,545	8.78	-34,110	-38.96	31.06	-22,430	-25.62	29.70
383**	Electrical apparatus, nec	1,077,302	8.41	-42,720	-3.97	37.35	-33,780	-3.14	34.91
3832	Radio,TV&communication equipment	-----	-----	-----	-----	-----	-----	-----	-----
3841	**Shipbuilding & repairing**	77,857	-56.28	7,626	9.79	6.31	4,311	5.54	7.30
3842+44+49	Other transport	-----	-----	-----	-----	-----	-----	-----	-----
3843***	Motor vehicles	618,584	74.97	-28,900	-4.67	14.51	-22,010	-3.56	15.17
3845	**Aircraft**	47,503	67.81	4,506	9.49	19.11	2,388	5.03	16.44
385	Professional goods	302,884	-2.63	-5,480	-1.81	42.65	-5,100	-1.68	43.18
39	Other manufacturing	106,000	-28.30	-24,960	-23.55	34.83	-17,680	-16.68	32.84
	Total	10,117,000	-8.34	-420,582	-4.16	28.79	-292,991	-2.90	27.77

Notes: "-----" indicates industries for which input-output data is unavailable; * includes 3522; ** includes 3832; *** indicates employment data from *Arbeits- und Sozialstatistik* . Industries indicated in bold letters are those for which values in both columns (3) and (6) are positive, identifying industries that are "trade winners."

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
OECD: *DSTI ((Input-Output Database)* , 1995;
OECD: *DSTI ((STAN Bilateral Trade Database)* , 1996;
Bundesministerium fuer Arbeit und Sozialordnung: *Arbeits- und Sozialstatistik. Hauptergebnisse;*

Table 8: Japan: Factor Content Analysis Results at the Industry Level Based on Expansion of Non-OECD Trade from 1970-1991 (20 Industries)

Industry		(1) Actual 1970 Employment	(2) Percent Change in Actual Employment 1970-1991	(3) Results Related to Factor Content Analysis Based on 1975 Economic Structure: Change in Employment From Trade	(4) Results Related to Factor Content Analysis Based on 1975 Economic Structure: Percent Change in Employment From Trade	(5) Results Related to Factor Content Analysis Based on 1975 Economic Structure: Percent Female	(6) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Change in Employment From Trade	(7) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Percent Change in Employment From Trade	(8) Results Related to Factor Content Analysis Based on 1990 Economic Structure: Percent Female
31	Food, beverages & tobacco	1,410,170	25.18	-62,240	-4.41	46.20	-40,650	-2.88	51.91
32	Textiles, apparel & leather	2,219,780	-22.92	-471,600	-21.25	64.46	-302,300	-13.62	67.84
33	Wood products & furniture	1,015,850	-35.17	-73,950	-7.28	31.49	-38,740	-3.81	27.54
34	Paper, paper products & printing	994,818	22.33	-19,700	-1.98	21.72	-11,040	-1.11	25.80
351+352-3522	**Industrial chemicals**	508,967	-13.64	6,794	1.33	25.09	4,522	0.89	25.22
3522	Drugs & medicines	117,123	21.03	-1,090	-0.93	25.09	-282	-0.24	25.22
353+354	Petroleum & coal products	48,256	0.88	-891	-1.85	14.04	-918	-1.90	11.43
355+356	Rubber & plastic products	527,104	70.85	-23,320	-4.42	31.21	-14,640	-2.78	31.51
36	**Non-metallic mineral products**	694,000	-10.23	4,037	0.58	25.82	1,777	0.26	23.78
371	Iron & steel	519,438	-9.43	1,294	0.25	8.20	-2,669	-0.51	8.52
372	**Non-ferrous metals**	150,562	13.95	23,430	15.56	17.47	15,300	10.16	18.06
381	**Metal products**	1,191,150	4.96	1,164	0.10	20.49	4,940	0.41	24.83
382-3825	**Non-electrical machinery**	1,462,576	6.08	222,600	15.22	14.32	79,430	5.43	19.52
3825	**Office & computing machinery**	177,704	124.05	5,186	2.92	35.69	1,410	0.79	38.74
383-3832	**Electrical apparatus, nec**	836,475	34.62	82,550	9.87	35.69	37,010	4.42	38.74
3832	**Radio,TV&communication equipment**	917,055	55.97	136,900	14.93	35.69	50,430	5.50	38.74
3841	**Shipbuilding & repairing**	269,798	-61.09	24,170	8.96	11.94	18,620	6.90	15.30
3842+44+49	Other transport	-----	-----	-----	-----	-----	-----	-----	-----
3843	**Motor vehicles**	752,323	50.25	68,100	9.05	11.94	43,840	5.83	15.30
3845	Aircraft	-----	-----	-----	-----	-----	-----	-----	-----
385	**Professional goods**	261,663	14.11	49,620	18.96	38.74	19,060	7.28	36.73
39	Other manufacturing	348,929	-10.96	-26,390	-7.56	33.46	-8,484	-2.43	46.83
	Total	14,423,741	9.18	-53,336	-0.37	29.47	-143,384	-0.99	32.80

Notes: "-----" indicates industries for which 1970 employment data is unavailable and which were thus excluded from calculations;
Industries indicated in bold letters are those for which values in both columns (3) and (6) are positive, identifying industries that are "trade winners."

Sources: OECD: *DSTI (STAN Industrial Database)*, 1995;
OECD: *DSTI ((Input-Output Database)*, 1995;
OECD: *DSTI ((STAN Bilateral Trade Database)*, 1996;
Japan Ministry of Labour: *Yearbook of Labour Statistics;*

Table 9: Germany: Pearson Correlation Coefficients and Probabilities (In Italics) for All Trade: Annual Averages, 1970-1991

	(1) Relative Import Penetration M/(Y+M-X)	(2) Relative Export Orientation X/(Y+M-X)	(3) Relative Import Penetration **Growth**	(4) Relative Export Orientation **Growth**	(5) Relative Employment **Growth**	(6) Relative Labor Intensity L/Y	(7) Number of Industries
(1) Relative Export Orientation	**0.64** ** *0.000*						29
(2) Relative Import Penetration **Growth**	-0.25 *0.196*	-0.20 *0.292*					29
(3) Relative Export Orientation **Growth**	**-0.33** # *0.084*	**-0.52** ** *0.004*	**0.74** ** *0.000*				29
(4) Relative Employment **Growth**	-0.20 *0.292*	0.29 *0.127*	**-0.35** # *0.065*	**-0.38** * *0.041*			29
(5) Relative Labor Intensity	**0.39** * *0.036*	0.27 *0.163*	0.14 *0.474*	0.10 *0.590*	-0.26 *0.173*		29
(6) Relative Female Representation (F/L*100)	**0.58** * *0.019*	-0.12 *0.661*	**0.52** * *0.040*	**0.44** # *0.092*	**-0.75** ** *0.001*	**0.43** # *0.099*	16

Notes: F = Female Employment, L = Employment, M = Imports, X = Exports, Y = Domestic Output;
All measures based on data for individual manufacturing industries indexed relative to data for the sum of manufacturing industries;
Numbers in bold letters indicate statistically-significant correlations,
and #, *, and ** indicate two-tailed significance at the 10-, 5- and 1-percent levels, respectively;
Growth in columns (3) and (4) is based on the logarithmic growth rate between average values for 1970-1972 and 1989-1991;
Growth in column (5) is based on average annual logarithmic growth rates.

Sources: OECD: *DSTI (STAN Industrial Database)*, 1995;
Bundesministerium fuer Arbeit und Sozialordnung: *Arbeits- und Sozialstatistik. Hauptergebnisse.*

Table 10: Japan: Pearson Correlation Coefficients and Probabilities (In Italics) for All Trade: Annual Averages, 1970-1991

	(1) Relative Import Penetration M/(Y+M-X)	(2) Relative Export Orientation X/(Y+M-X)	(3) Relative Import Penetration **Growth**	(4) Relative Export Orientation **Growth**	(5) Relative Employment **Growth**	(6) Relative Labor Intensity L/Y	(7) Number of Industries
(1) Relative Export Orientation	0.23 *0.215*						31
(2) Relative Import Penetration **Growth**	-0.16 *0.377*	-0.18 *0.342*					31
(3) Relative Export Orientation **Growth**	-0.07 *0.715*	0.19 *0.300*	0.001 *0.995*				31
(4) Relative Employment **Growth**	-0.06 *0.737*	0.18 *0.337*	**-0.49** ** *0.006*	-0.16 *0.385*			31
(5) Relative Labor Intensity	-0.06 *0.764*	0.39 *0.028*	0.05 *0.775*	**-0.31** # *0.085*	0.02 *0.907*		31
(6) Relative Female Representation (F/L*100)	**0.55** * *0.027*	-0.10 *0.719*	**0.57** * *0.022*	**-0.63** ** *0.008*	0.03 *0.899*	**0.46** # *0.070*	16

Notes: F = Female Employment, L = Employment, M = Imports, X = Exports, Y = Domestic Output;
All measures based on data for individual manufacturing industries indexed relative to data for the sum of manufacturing industries;
Numbers in bold letters indicate statistically-significant correlations,
and #, *, and ** indicate two-tailed significance at the 10-, 5- and 1-percent levels, respectively;
Growth in columns (3) and (4) is based on the logarithmic growth rate between average values for 1970-1972 and 1989-1991;
Growth in column (5) is based on average annual logarithmic growth rates.

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
Japan Ministry of Labour: *Yearbook of Labour Statistics* .

Table 11: Germany: Variables for All Trade: Annual Averages, 1970-1991 (16 Industries)

Industry		(1) Relative Import Penetration M/(Y+M-X)	(2) Relative Export Orientation X/(Y+M-X)	(3) Relative Import Penetration **Growth**	(4) Relative Export Orientation **Growth**	(5) Relative Employment **Growth**	(6) Relative Labor Intensity L/Y	(7) Relative Female Representation F/L*100
31	Food, Beverages & Tobacco	64.25	28.29	-28.09	68.14	-0.05	72.59	150.75
321	Textiles	186.29	104.27	11.68	3.98	-3.26	156.00	184.56
322	Wearing Apparel	212.15	56.98	30.74	44.62	-4.18	184.45	286.43
323+324	Leather Products, Footwear	220.64	65.82	21.63	13.41	-4.49	162.95	210.99
33	Wood Products & Furniture	70.65	37.01	11.07	42.66	-0.09	143.18	66.52
341	Paper & Products	136.17	60.43	-11.66	64.71	-0.14	100.76	113.36
342	Printing & Publishing	28.27	48.22	8.53	4.85	0.08	149.56	121.22
35	Chemical Products	98.73	89.77	2.88	-4.16	0.91	58.83	100.99
36	Non-Metallic Mineral Products	52.57	47.42	1.66	4.87	-1.13	113.53	70.75
37	Basic Metal Industries	106.59	90.48	-30.63	-15.74	-1.04	99.30	48.13
381	Metal Products	51.71	81.39	4.70	-19.72	0.29	177.72	42.42
3825+383	Office&Computing Machinery, Elec. Mach.	100.15	100.47	33.21	-4.48	0.69	118.58	125.74
3829	Machinery & Equipment, nec	82.48	211.58	-12.37	-36.73	0.42	101.48	55.31
384	Transport Equipment	120.32	220.76	-4.98	-36.15	2.22	73.87	51.27
385	Professional Goods	308.16	360.77	7.50	-21.67	0.40	258.76	151.77
39	Other Manufacturing, nec	257.17	184.69	-17.90	-34.69	-1.06	143.81	119.90
	Base:	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Mean:	131.02	111.77	1.75	4.62	-0.65	132.21	118.76
	Standard Deviation:	82.12	89.33	18.71	34.20	1.86	50.84	67.28

Notes: F = Female Employment, L = Employment, M = Imports, X = Exports, Y = Domestic Output;
All measures based on data for individual manufacturing industries indexed relative to data for the sum of manufacturing industries;
Female Representation has data for only 16 industries and is based on years 1975-1991;
Growth in columns (3) and (4) is based on the logarithmic growth rate between average values for 1970-1972 and 1989-1991;
Growth in column (5) is based on average annual logarithmic growth rates.

Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
Bundesministerium fuer Arbeit und Sozialordnung: *Arbeits- und Sozialstatistik. Hauptergebnisse.*

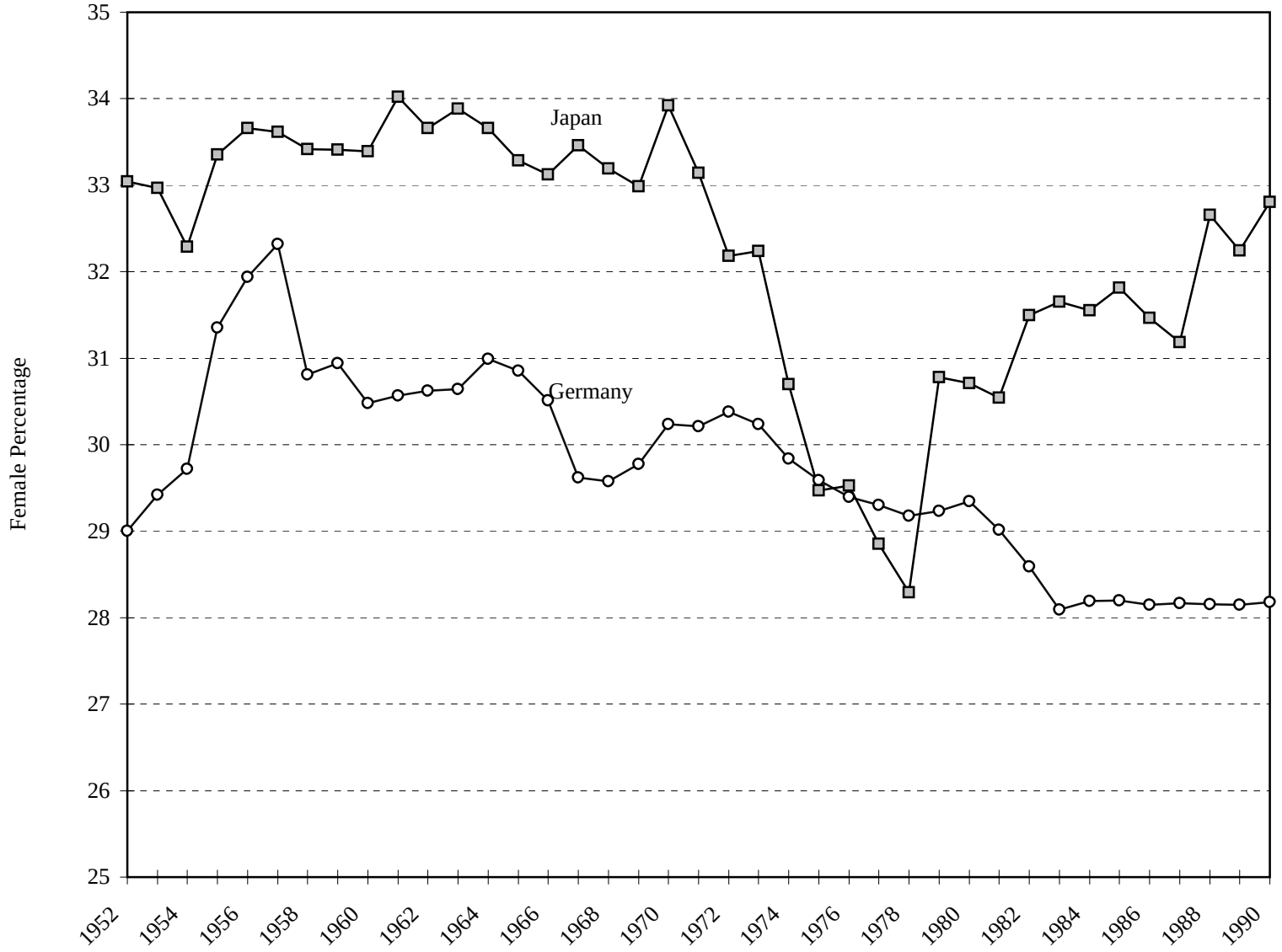
Table 12: Japan: Variables for All Trade: Annual Averages, 1970-1991 (16 Industries)

Industry		(1) Relative Import Penetration M/(Y+M-X)	(2) Relative Export Orientation X/(Y+M-X)	(3) Relative Import Penetration **Growth**	(4) Relative Export Orientation **Growth**	(5) Relative Employment **Growth**	(6) Relative Labor Intensity L/Y	(7) Relative Female Representation F/L*100
31	Food, Beverages & Tobacco	139.66	9.57	-11.51	-148.14	0.66	86.96	152.74
321	Textiles	188.33	105.03	83.28	-70.92	-2.63	269.59	185.03
322	Wearing Apparel	158.74	36.82	107.65	-283.35	1.22	190.90	247.57
323+324	Leather Products, Footwear	168.95	47.54	107.86	-160.63	-0.26	85.40	152.27
33	Wood Products & Furniture	130.21	8.03	74.64	-135.37	-2.47	195.35	97.01
341	Paper & Products	75.74	19.55	8.75	6.15	-0.28	79.08	80.99
342	Printing & Publishing	17.26	7.44	-82.77	-116.03	0.97	151.07	65.24
35	Chemical Products	140.04	53.10	-1.28	0.43	0.74	60.67	76.68
36	Non-Metallic Mineral Products	26.62	42.57	77.35	-21.16	-0.92	135.70	79.36
37	Basic Metal Industries	75.52	83.08	17.43	-71.41	-0.61	33.73	34.66
381	Metal Products	34.90	87.15	23.64	-44.00	-0.18	201.27	76.74
3825+383	Office&Computing Machinery, Elec. Mach.	71.69	185.61	-25.36	11.99	1.62	195.56	124.80
3829	Machinery & Equipment, nec	72.59	148.43	-59.57	48.60	-0.13	132.22	51.95
384	Transport Equipment	62.32	313.15	-7.79	9.97	0.35	74.07	43.29
385	Professional Goods	320.56	511.30	36.11	64.01	0.22	199.17	125.77
39	Other Manufacturing, nec	90.10	45.30	-36.86	-91.14	-0.96	58.29	118.77
	Base:	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Mean:	110.83	106.48	19.47	-62.56	-0.17	134.32	107.05
	Standard Deviation:	76.42	134.41	58.01	91.20	1.19	68.60	56.71

Notes: F = Female Employment, L = Employment, M = Imports, X = Exports, Y = Domestic Output;
All measures based on data for individual manufacturing industries indexed relative to data for the sum of manufacturing industries;
Female Representation has data for only 16 industries;
Growth in columns (3) and (4) is based on the logarithmic growth rate between average values for 1970-1972 and 1989-1991;
Growth in column (5) is based on average annual logarithmic growth rates.

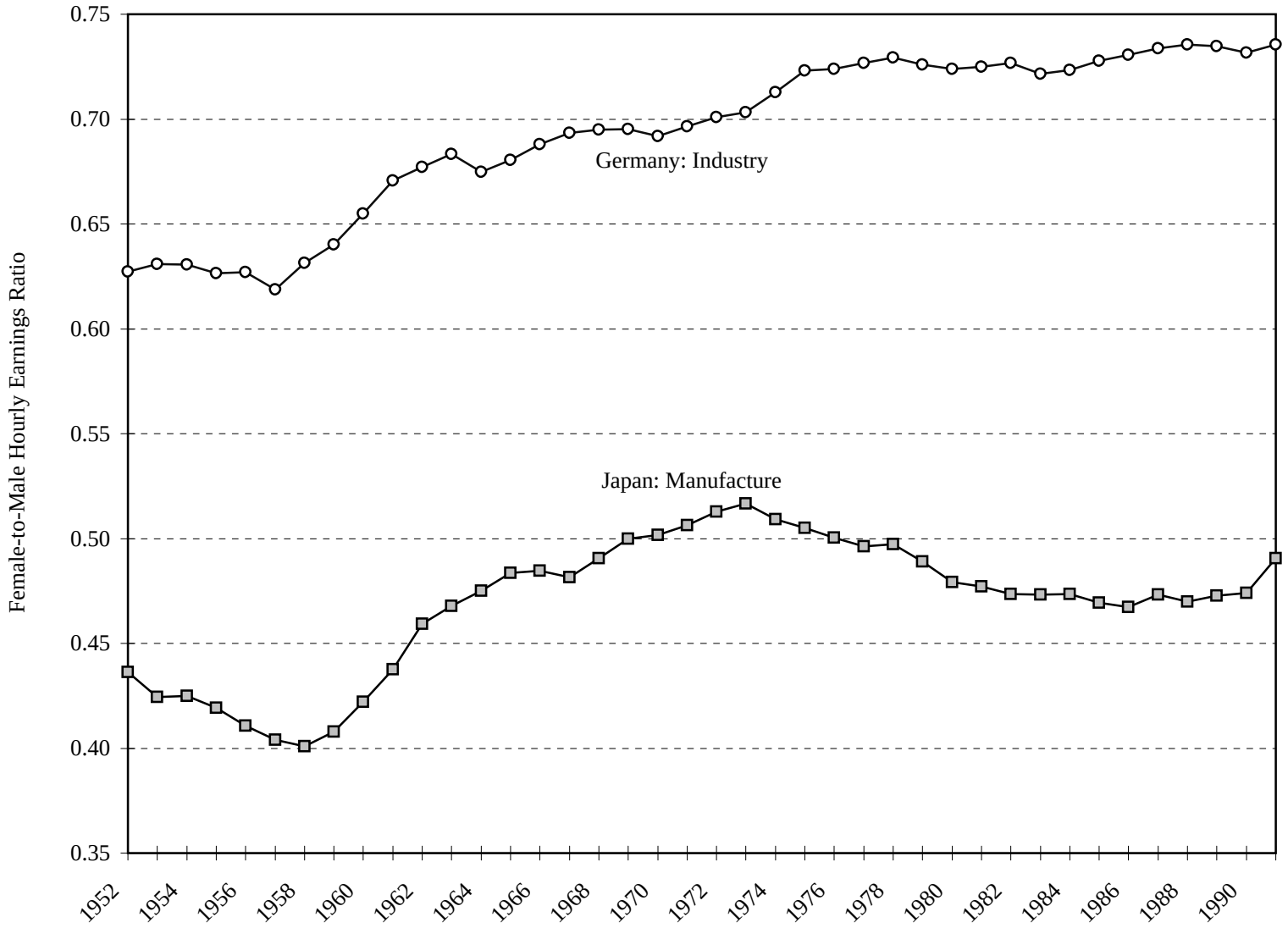
Sources: OECD: *DSTI (STAN Industrial Database)* , 1995;
Japan Ministry of Labour: *Yearbook of Labour Statistics* .

Graph 1: Germany and Japan: Female Percentage for Manufacturing Employees: 1952-1990



Sources: *Arbeits- und Sozialstatistik. Hauptergebnisse* ; *Statistisches Jahrbuch fuer die Bundesrepublik Deutschland* ; Japan Ministry of Labour: *Yearbook of Labour Statistics* .

Graph 2: Germany and Japan: Female-to-Male Hourly Earnings Ratio: 1952-1991



Sources: Statistisches Bundesamt: *Statistisches Jahrbuch fuer die Bundesrepublik Deutschland* ;
Japan Ministry of Labour: *Yearbook of Labour Statistics* .