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GLOBALIZATION & LABOR: THE EFFECT OF IMPORTED INPUTS ON BLUE COLLAR WORKERS

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Globalization & Labor: The Effect of Imported Inputs on Blue Collar Workers

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Kroll, Cynthia A. *Foreign Trade and California's Economic Growth: Issues and Research Approach*, Working Paper 98-257. Fisher Center for Real Estate and Urban Economics, University of California, Berkeley, 1998.

Jaffee, Dwight M. *International Trade and California's Economy: Summary of the Data*, Working Paper 98-258. Fisher Center for Real Estate and Urban Economics, University of California, Berkeley, 1998.

Jaffee, Dwight M. *International Trade and California Employment: Some Statistical Tests*, Working Paper 98-259. Fisher Center for Real Estate and Urban Economics, University of California, Berkeley, 1998.

Kroll, Cynthia A., and Josh Kirschenbaum. *The Integration of Trade into California Industry: Case Studies of the Computer Cluster and the Food Processing Industry*, Working Paper 98-260. Fisher Center for Real Estate and Urban Economics, University of California, Berkeley, 1998.

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Bardhan, Ashok Deo, and David K. Howe. *Transnational Social Networks, Transportation Costs, and the Geographic Distribution of California's Exports*, Working Paper 98-262. Fisher Center for Real Estate and Urban Economics, University of California, Berkeley, 1998.

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The work is also reported in two publications of the California Policy Seminar:

The research is summarized in depth in Cynthia A. Kroll, Dwight M. Jaffee, Ashok Deo Bardhan, Josh Kirschenbaum and David K. Howe, *Foreign Trade and California's Economic Growth*, California Policy Seminar, Berkeley, 1998. A much briefer summary is available in a California Policy Seminar *Policy Brief* of the same title.

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Globalization and Labor: The Effect of Imported Inputs on Blue Collar Workers

Abstract

This paper assesses the impact of trade on inequality. We look at the impact of the twin forces of global economic integration and reactive restructuring in response to recessionary downturns, on the relative demand for blue collar workers in the manufacturing industries in California. During the period 1982-1994, the average real wages of blue collar workers in the state decreased by 3.2%, while those of white collar workers went up by 21.6%. We find that an increase in imported intermediate goods accounts for approximately 25% of the drop in payroll share of blue collar workers in California, during the period 1987-1992. This effect is particularly severe in those sectors that were affected in a significant way during the recession, and experienced a substantial drop in the demand for their products. The impact of imports of final goods turns out to be ambiguous, suggesting that in evaluating the effect of international trade it is important to account for the imported inputs channel.

Globalization & Labor: The Effect of Imported Inputs on Blue Collar Workers

Introduction:

In the United States, the wage gap between blue collar (production) and white collar (non-production) workers in the manufacturing sectors grew from approximately $10,000 in 1982, to $20,000 in 1994. A similar, more acute process occurred in the state of California where the wage gap grew from $10,000 to about $25,000 over the same period. Although this pattern of growing wage inequality has been well documented, its causes remain a matter of contention within the economics profession. Some ascribe perhaps a sixth or a third of the expanding inequality to growing international trade and investment. Others find the globalization effect to be negligible: they believe the phenomenon of growing inequality to be linked with technological change or perhaps exogenous shifts in preferences and product demands.

Our paper aims to contribute to the debate by looking exclusively at the economy of California, a state where wage disparities, and the forces of both global economic integration and technological change are at their most intense. We will be focusing primarily on the impact that global linkages have on the economic fortunes of blue collar and white collar workers in the manufacturing sector, sometimes referred to as production and non-production workers, respectively[1].

Our primary goal is to examine the effect of foreign trade in intermediate goods on relative wages and employment of blue collar workers. Feenstra and Hanson looked at this particular channel for the entire US and found it significant for the 1979-1990 period, although the effect appeared to be driven by extraordinary shifts in the relative demand for blue collar labor during two particular years, 1979 and 1981. Our results are generally consistent in the case of California, less so for the rest of the US (which we label RUSA). We look at the twin forces of globalization and recessionary downturns leading to an opportunistic or reactive restructuring in the manufacturing sectors. Although restructuring can occur in any industry, it predominates in those experiencing substantial

[1] These workers are sometimes called unskilled (blue collar) and skilled (white collar) workers. The general convention in the Annual Survey of Manufacturers (ASM) and the Census of Manufacturers (COM) is to refer to them as production (blue collar) and non-production (white collar) employees.

drops in the demand for their product; as Andy Grove of Intel once noted, "Emotionally, it's easier to change when you're hemorrhaging."[2]

Literature Review:

Standard international trade theory, embodied in the Stolper-Samuelson theorem and the Factor Price Equalization and Insensitivity (FPI) theorem, implies that changes in the international marketplace are communicated through relative price changes. The FPI theorem contends that changes in factor prices, e.g. wage levels, are caused by changes in prices of traded products, and in the absence of the latter, simple quantitative changes in import levels should not affect wages. Grossman (1987) estimates the impact of international competition, in the form of import price indexes, on wages and employment in 9 US manufacturing industries. He reports that the elasticity of domestic wages with respect to import price indexes is statistically indistinguishable from zero. Whether these results reflect an underlying insensitivity of wages to international factors or merely systematic bias in available price data remains unclear. At the very least, Krugman and others have noted that the period of greatest trade expansion –from 1950 to the mid 1970s- generally *preceded* the span of time with growing wage inequality.

Economists who find a link between trade and inequality typically (though not always) estimate partial equilibrium equations which link import levels to wage or employment levels (e.g., Katz and Murphy, 1992). The debate in the discipline centers on trade theorists, who argue that workers will be displaced or forced to take wage cuts only in industries where product prices are falling, and labor economists who maintain that imperfect measurement of product quality renders us incapable of perceiving such drops in final good prices and that regardless, trade in goods embodies the factors employed. The latter implies that an increase in the level of imports is tantamount to an increase in the supply of the embodied factor, and hence a fall in its relative price.

Our study utilizes a different approach, originally developed by Feenstra and Hanson (1996). We focus on one aspect of globalization, the substitution of unskilled in-house labor with foreign intermediate inputs. Feenstra et al point out that such outsourcing tends to narrow down the range of economic activities of a firm and hence changes the relative demand for different types of labor within the firm. A general

equilibrium model in Baldwin and Cain (1994) shows this mechanism to be theoretically sustainable: imported inputs allow foreign labor to compete with unskilled domestic labor even in the absence of changes in output prices. The reduction in relative demand for blue collar workers can thus be partly attributable to the increase in the share of imported inputs used by an industry.

Our study is the first to examine trade effects on California labor in the manufacturing sectors. We use a large amount of underutilized data in the form of the regional versions of the Census of Manufactures (COM), the Annual Survey of Manufacturers (ASM), California Customs District data, MISER (Massachusetts Institute of Social & Economic Research) data on state exports, as well as somewhat better known sources, like the Department of Commerce, the Bureau of Labor Statistics and others which will be acknowledged in the course of the paper.

In addition, we examine the different adjustment processes at work in California vis-à-vis the rest of the United States in response to trade and demand shifts. We will be looking at the question of integration of the US national market from a different viewpoint. The issue has hitherto been studied through the behavior of relative prices, capital flows etc. between various states of the union. We shall evaluate by observing the changes in wage shares of blue collar workers across SIC codes for CA and RUSA.

Empirical Results:

As the first step in our empirical work we use COM and ASM regional data to calculate the employment and wage shares of blue collar workers by 3 digit SIC codes (Standard Industrial Classification)[3] for the state of California. The COM data is for every 5 year interval: 1982, 1987 and 1992. The ASM is an annual publication with the most recent reliable data being available for 1994. We can thus look at the period 1982-1994. After calculating the employment and wage shares we look at the change in the shares over the relevant periods.

A) Employment Shares

[2] Quoted in Sherman (1993).

[3] The ASM and the COM both include data on total payroll, total wages of blue collar workers, total no. of employees, total no. of blue collar workers etc.

Over the period 1982-1994 the state lost close to 111,500 blue collar jobs and around 17500 white collar jobs in manufacturing. In most sectors within manufacturing, although significantly not in all sectors, the decreases in blue collar jobs were much more severe than those for white collar jobs.

The employment share of blue collar workers in an industry is defined as the ratio of blue collar workers employed to the total number of employees. Over the period 1982-1994, the share of blue collar workers in the total number employed in manufacturing in California dropped from 60.3% to 58.5%. As can be seen from our TABLE 1 (all Tables are in the Appendix), the share of blue collar workers varies widely by SIC code. For the year 1994, the share of blue collar workers' employment was highest, and understandably so, in labor intensive industries like blown glass (SIC 322, 89%), footwear (SIC 314, 88.9%), knitting mills (SIC 225, 87.5%). The share was lowest in highly mechanized, automated and high-tech industries, like publishing (SIC 271-273, 17-30%), computers (SIC 357, 26.3%) and guided missiles and space propulsion (SIC 376, 19.6%). A more relevant statistic however, is the change in the share of blue collar workers by SIC codes, over a relevant time period, to get a sense of the underlying trends in the economy and to understand the structural shifts that are taking place. As TABLE 2 shows, for the state as a whole there was a shift of –2.95% in the share of blue collar workers in the period 1982-94 and –0.7% in the period 1987-94. The years 1982-87 seems to have been a period of severe structural change, with a –2.27% change in share of blue collar workers. The greatest drop in the share, over the period 87-94[4], is in guided missiles (SIC 376, -40.6%), and which dropped from 33% in 1987, an already low figure, to 19.6% in 1994, miscellaneous furniture (SIC 259, -21.9%), publishing (SIC 271,274, -18%) and computers (SIC 357, -17.5%).

At the same time, in a number of industries there was a significant shift in favor of blue collar workers, with their share increasing between 1987 and 1994. Important among

[4] We prefer to use the years 1987-1994 for comparison purposes for two reasons. Firstly, they correspond to approximately the same stage in the business cycle, and secondly, the data for 1982 is sparse and does not cover a number of SIC codes. Also, there are some concordance problems with the SIC codes. Even for 1987 and 1994, we report changes in the shares only for those SIC codes for which data is available in both the years. Table 2A shows the percentage change in share of blue collar workers by SIC code ranked in ascending order for the period 1987-94. Practically all the high-tech industries in California have experienced a drop in the share of blue collar workers in their total labor force.

these are: industrial organic chemicals (SIC 286, 28.7%), communications equipment (SIC 366, 21.6%), miscellaneous chemicals (SIC 289, 21.5%), miscellaneous petroleum products (SIC 299, 14.3%) and general industrial machinery (SIC 356, 13.5%). Of these, for SIC codes 286, 356 and 366 there is considerable drop between 1982 and 1987, the time of severe structural change, which partially accentuates the increase later on. Also, it should be noted that these are shares: indeed, in terms of absolute numbers, two of these SIC codes 286 and 289 actually saw a drop in the number of blue collar workers from 1600 to 1000 and from 4100 to 3700 respectively. Obviously, since the drop in white collar workers was even more precipitous, the share of blue collar workers in total employees increased[5].

B) Payroll Shares

The payroll (wage) share of blue collar workers in an industry is defined as follows:

$$\varpi_i = \omega_{ip} l_{ip} / (\omega_{ip} l_{ip} + \omega_{in} l_{in}),$$

where ω_{ip} is the average wage of blue collar workers in industry i, l_{ip} is the number of blue collar workers in industry i, and ω_{in} , l_{in} are similar variables for white collar workers.

The drop in payroll shares of blue collar workers in the total industry payroll has been more dramatic compared to employment shares. TABLE 3 and TABLE 4 show the payroll shares in different years and the change in the period 1982-1994, respectively. For the state as a whole there was a fall of –15.5% in the share of blue collar workers' wages. The sharpest drop as expected is in high-tech industries like guided missiles, computers, instruments, drugs telecom, industries with increasing use of automation, like publishing etc.(see Table 4A, which lists the change in ascending order for the years 1987-1994), i.e. the composition is similar to that of employment shift, except for some codes like 356 (General Industrial Machinery), which has an increase of 13.5% in terms of employment share of blue collar workers but a decrease in payroll share of -3.94% for the years 1987-1994. Practically all the industries, which experienced an increase in the production payroll share, also had an increase in the employment share of blue collar workers. Later on we

[5] We find no correlation between the changes in the two periods.

can see that the dynamics of average individual wages by industry, of production and white collar workers will throw some additional light on these figures[6].

We also calculate correlation matrices between the change in payroll shares for CA and for the rest of US (Calculated as the US minus CA), for the two periods 1982-87 and 1987-92. The labor market adjustment process, whatever its source, seems to occur differently in the two regions. Although, for both regions as a whole, there is a drop in the payroll share of blue collar workers, the adjustment seems to happen across two different sets of industries. The correlation across 4 digit SIC codes is quite low to begin with across the period 1982-87 (0.25), and goes down further in the subsequent period to 0.11. The state of California seems to have undergone a much more severe restructuring in terms of the drop in blue collar payroll share vis-à-vis the rest of the US. As the data below reveals, CA has had a 50% and 100% greater drop in the periods 1982-87 and 1987-1992 respectively, relative to the RUSA.

	1982-87		1987-92	
	CA	RUSA	CA	RUSA
Average Change	-0.013	-0.008	-0.037	-0.016
Correlation Coeff.	0.25		0.11	

C) Wages

We now turn to the average wages per worker, both blue collar and white collar, by 3 digit SIC codes from 1982 to 1994. Table 5 gives the nominal(in current dollars) wages for production and non-production employees by 3 digit SIC codes for the years 1982, 87 and 94, as well as the ratio of blue collar to white collar individual wages. We also calculate the change in *real* wages from 1982 to 1994 by adjusting the changes with the CPI for California's grade A and grade B cities. These are shown in Table 6. Over the 12 year period in question, real wages of blue collar workers in California's manufacturing sectors have fallen by 3.2% while at the same time, those of white collar workers have risen by 21.6%. Except for a few sectors such as ship building, children's undergarments and a few others, the gains for white collar workers are nearly universal across individual

[6] As in the case of employment shares, we check for any correlation between the changes in the payroll

sectors within manufacturing. Although the number of sectors in which the blue collar workers saw an increase in their real wages is only slightly less than the ones in which their wages decreased, the weight of the former is much less in the economy of the state. Major sectors that experienced falling blue collar wages include the food processing sectors, communications equipment, and ordnance and accessories. Blue collar workers however, also gained increases in computer and office equipment, some electronic sectors and some textile sectors, among others.

Estimation Results

Imported Inputs and Impact on Payroll Shares:

In this section we follow the model used by Feenstra et al, with some changes enumerated below. The model attempts to assess the impact of trade on the payroll share of blue collar employees through the medium of imports of intermediate goods or inputs, also known as foreign outsourcing. The economic rationale is that outsourcing results in a shift in demand away from unskilled labor, and therefore one can utilize reduced-form regressions embodying the relationship between foreign outsourcing, or imported inputs, and the unit input requirement for skilled labor proxied by payroll share of blue collar workers.

We estimate the following equation:

$$\Delta\varpi_j = c + \beta\Delta s_j + \gamma\Delta C_j \qquad 1)$$

where $\Delta\varpi_j$ is the change in the payroll share of blue collar workers in a 4 digit manufacturing industry in California between 1987 and 1992; Δs is the change in outsourcing (change in share of imported inputs) defined below; ΔC refers to various control variables, and c, β, and γ are constants/coefficients.

The model takes the difference between 1987 and 1992 values of the variables to control for possible fixed effects. The years 1987 and 1992 correspond to Economic Census years, when detailed 4 digit data is available for California. For interim years, California data is only available at a 3 digit level from the Annual Survey of Manufacturers.

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shares in the two periods, 1982-87 and 1987-94. The results are not significant statistically.

A) Calculation of Share of Imported Inputs:

The Economic Census of Manufactures for the US as a whole includes tables with identified inputs by 4 digit SIC code for each 4 digit SIC industry. The data includes the dollar amounts spent by each industry on each identified input, as well as energy, fuel purchases and total material/input purchases. In the first stage we calculate the amount of imported inputs used in each industry as follows:

The imported input variable, Δs_j, denotes the change in the share of imported inputs over total materials net of energy, or $\Delta(O_j/M_j)$, where

$$O_j = \Sigma_i \left(m_{ij} * (M_j/\Sigma_i m_{ij}) * \{I_i /(Y_i - X_i + I_i)\} \right) \qquad 2)$$

In the equation, m_{ij} are the materials from industry i used in the production process of industry j. The next term, $(M_j/\Sigma_i m_{ij})$, is greater or equal to one and adjusts for the fact that different shares of total materials are reported by type for different industries. $I_i/(Y_i-X_i+I_i)$ is the import intensity index (III_i). Here I_i are the US imports of this input, X_i are the exports and Y_i the total sales. The index **III** therefore is a measure of the share of imports in the total domestic market. The underlying assumption is that imported inputs are used by each industry in the same proportion that they occupy in the total domestic market. For example, if imported integrated circuits have 25% of the domestic market then for an industry using $1 billion of integrated circuits as inputs, we assume that approximately $250 million are of foreign origin[7]. The imported inputs are then summed up over the entire range of identified inputs. The *share* of imported inputs in total material purchases s_i is then calculated by dividing O_j by the total material purchases by industry *j* less energy and fuel.

Except for s_i and the capital-sales ratio, the variables mentioned above have been constructed using raw California data. Since the Economic Census (regional) does not publish state level input data, we have used the corresponding US 4 digit data, implicitly assuming a similar input structure for California's industry, or at least similar changes in the two regions' intermediate goods purchasing behavior.

[7] The basic equation has the same specification as that used by Feenstra and Hanson (1996), as verified by private correspondence with the latter in 1997, except that our import intensity measure nets out the effect of exports in the denominator to more accurately capture the size of the domestic market.

Control variables include a measure of the change in the US capital/sales ratio, calculated from the NBER productivity database and %PEAK, a variable reflecting business cycle effects. %PEAK takes the 1992 sales as a percentage of the maximum sales during the 1987-1992 period. It compensates for the fact that the end of our interval occurred during a year of solid growth for the US as a whole but declining gross state product for California.[8] It is calculated at the three digit level, due to the aforementioned data constraints.

To measure whether a sector intensifies its restructuring when faced with a large sales decline, we interact our imported input measure with DEPTH, another 3 digit variable which measures the worst downturn faced by each industry during the period:

$$DEPTH = \min_{t=87\text{-}92} \{ (Sales_t / \max(sales_{87\text{-}(t\text{-}1)}) \}, \qquad 3)$$

subject to the mostly nonbinding constraint that the variable never exceed unity. DEPTH reflects the intensity of each industry's downturn during the period.

B) Results:

Since this is a cross-sectional time-differenced regression for over 200 SIC codes we have applied weights to the various variables so that a large number of SIC codes with little significance in terms of either sales or employment etc. do not contribute disproportionately to the result. All variables are therefore weighted by the particular industry's share of payroll in each region, California and RUSA.

The scatterplots in figure 1 show the generally negative correlation between imports of intermediate goods and changes in the share of blue collar payroll. The relationship reflects adjustments in a relatively small number of unusually large industries. This is perhaps not surprising, since we are studying a form of vertical (dis)integration, which is likelier to have an opportunity to occur within large-scale concerns.[9] The outlying industry in the RUSA scatterplot, aircraft, is dropped from the regressions to prevent it from dominating the results. The table above the scatterplots reveals that the standard deviation of our left hand side inequality variable is over three times as high in

[8] For the US, GDP grew at 0.1% in 1991 and 3.5% in 1992. GSP for California was –1.8% and –0.6% during these two years.

[9] Hypothetically, of course, an SIC code could encompass an industry demanding large amounts of labor in a given region, but nevertheless consisting of a large number of small plants rather than a few big ones.

California as it is in RUSA. We shall see that RUSA's results are correspondingly less robust than we would like.

A more whimsical view of the data is shown in figure 2, where we plot our two variables of interest against the SIC codes. Large (and opposite) changes in both variables are clustered in the high tech range of the SIC codings, for example computers, aircraft and instruments. This pattern applies particularly to California; RUSA's (smaller) changes are distributed more evenly across the SIC spectrum.

Table 7 presents our basic OLS results. Columns 1 and 3 show an expected negative relationship between changes in imported inputs and changes in the blue collar share of payroll. In RUSA, though, the effect is insignificant and substantially smaller in magnitude.[10]

Columns 2 and 4 show our preferred specification. The existence of an interaction term implies that the results must be interpreted with some care. Taking the derivative of the left hand side variable with respect to imported inputs yields the following:

$$d\Delta\omega_j/d\Delta s_j = \beta_1 + \beta_5 * DEPTH \qquad 4)$$

Those values and their standard errors are reported at the bottom of the table. For values of depth between minus one and plus one standard deviation around the mean, there is a significant imported input effect for California. For RUSA the effect is less intense: significant results are obtained only when sales drop by over 15% during the period; in California sales need to drop only 6% to produce a significant effect.

Interestingly, the standard errors of the estimates of the two regions are comparable; the difference lies largely in the coefficients, even controlling for the deeper recession experienced by California. That is, for a 20% decline in sales, a given change in imported inputs results in a drop in the payroll share in California that is over three and a half times that of RUSA. Possible explanations for the differences between the regions will be discussed below.

To see whether an industrial downturn affects the propensity to restructure, β_5 (which is the derivative of equation 4 with respect to DEPTH) can be examined. It is positive and highly significant for both regions. The F-tests came out significant but are

[10] We also ran a specification using an imported input variable constructed from trade data collected at California ports of entry. Unfortunately, this data also covers transshipment trade attributable to inland states. We found the results insignificant.

less discriminating, reflecting only the joint significance of the imported input variable and its interaction with DEPTH.

In California and RUSA, the share of blue collar payroll dropped 3.8 and 2.4 percentage points, respectively. Using coefficients from our preferred regression evaluated at the mean value of DEPTH, we find that changes in imported inputs account for about a quarter of the change in blue collar shares for California but only 5% for the remainder of the US.[11]

C) Endogeneity Concerns

There are presumably some unmodeled relationships between some of our right hand side variables, in particular between the capital/sales ratio, the share of nonenergy materials that are imported and perhaps the cyclic proxies. Rather than model these relationships explicitly, we employ an instrumental variables approach.

Our instrument is the change in exports within the inputting industries of the particular output industry or Δx_j, where

$$x_j = \Sigma_i \{(m_{ij}/\Sigma_i (m_{ij}))*(X_i/Y_i)\}. \qquad 5)$$

X_i are the exports of the inputting industry; Y_i are the sales of the inputting industry. As before, m_{ij} refers to the nonenergy materials of industry j, as produced by industry i. The instrument will be correlated with our imported inputs measure, since there is typically a positive correlation between an (inputting) industry's imports and its exports.[12] At the same time, the foreign sales of these intermediate goods industries should be largely unrelated to the production choices made by their downstream counterparts. That is, the instrument should be uncorrelated with the error term. The interaction term uses the instrument x_j*DEPTH.

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[11] To calculate this, we take the coefficient on imported inputs, evaluated at the mean of the depth variable, and multiply it by .0168, the change in imported inputs over the period. Then, we divide by the total change in blue collar payroll shares over the period (-.0380) to find the share of inequality that is accounted for by changes in imported inputs. Applying the averages of the 5 quintiles of DEPTH, to better capture the entire distribution, didn't affect our results substantially.

[12] Recent literature on intra-industry trade, even at the 4-digit SIC level, demonstrates the high correlations between exports and imports within an industry. One could also argue that the jobs lost by lower downstream demand for domestically produced intermediate goods could be offset by higher exports in the upstream industries. This would miss the point however: our regressions measure changes in the relative demand solely among *downstream* assembly plants. Gains and losses among workers in the domestic supplier industries are not examined, except insofar as the firms purchase goods from suppliers in their own (4 digit) industry. Furthermore, our left hand side variable, Δs, measures the effects of

Regressions with instruments are shown in Table 8. For California, the imported input effect remains significant after the introduction of the instruments. The signs change for RUSA: higher imported inputs appear to lead to *higher* relative demand for blue collar labor, which is somewhat puzzling.

Two broad explanations come to mind. First, we can't overlook the possibility that imported inputs in certain circumstances may embody high skill technology imported from abroad and thereby substitute for nonproduction labor.[13] Secondly, our results may reflect the migration of manufacturing from high wage states such as California to lower wage states such as Arizona or Texas in addition to foreign outsourcing. Both of these explanations would apply well to the sort of high tech industries that drive our results.

Table 9 profiles two industries with diverging experiences in California and RUSA. In particular, while they imported an increasing share of their inputs during the period, the Semiconductor and the Electronic Component industries' relative demand for blue collar workers declined in California but rose in the rest of the US. Possibly as a result, the blue collar wage gap between California and RUSA declined over the period.

From California's perspective, high tech demand for blue collar labor in these two industries appears to have shifted to both foreign countries and foreign states in the US, while higher skilled jobs have remained concentrated within its borders. Although white collar employment in California actually shrank for one of the industries, this was overwhelmed by substantial increases in white collar wages, both absolutely and relative to RUSA.

If there is a process occurring that favors production workers in RUSA, it does not appear to be related to the business cycle. The interaction coefficient was insignificant, suggesting that sectors were not prompted by declining sales to shift their input mix in favor of blue collar workers.

D) Decomposition

Running our model with blue collar wage and employment shares separately on the left hand side in Table 10 shows that relative wage declines among blue collar workers

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changes in the *share* of total nonenergy inputs produced abroad. It is hoped that this variable would proxy for the greater use of foreign intermediate goods that embody lower skilled labor.

[13] Fagan (1991) notes that foreign outsourcing allows managers access to a wider range of technologies. Kotabe (1989) alludes to the expanding use of foreign R&D affiliates by US multinationals, but allows that they do not appear to increase intrafirm imports from abroad.

explained most of the changes in payroll disparity in California. The effects of imported inputs on employment are more ambiguous. For an industry experiencing an average downturn, the OLS results suggest that imported inputs decrease relative demand for blue collar workers while instrumental variables produce opposite, though insignificant, results. Although the instrumental variables technique yields consistent estimates, it is at the cost of larger standard errors; as a result it is not immediately clear which method would be preferred on mean square error grounds.[1]

For RUSA, evidence of relative wage losses by blue collar workers is much less pronounced. Among the roughly half of all industries experiencing a drop in sales of less than ten percent, blue collar workers suffered no significant relative wage loss. Among industries declining only four percent or less, blue collar workers may have gained. There is weak evidence favoring a positive relationship between imported inputs and RUSA blue collar employment, consistent with the explanations in the previous section. The evidence is weak since the OLS regression gives insignificant (and near-zero) results and the instrumental variables regression has an adjusted R^2 of .01.

E) Import Competition

So far we have reported a less explored channel by which international trade can affect disparities in the demand for less skilled workers. In Table 11 we add more conventional measures of changes in imports in the output market. Columns 1 and 3 contain changes in the import intensity index defined earlier, except that it applies to the output, or final goods markets. In both California and RUSA, there is no evidence for any imported output effect. These less than robust results suggest to us the importance of controlling for imported inputs when evaluating the effects of international trade on inequality. Significant results for our imported input variables remained, demonstrating that for California the significant channel of impact is imported inputs rather than the impact of international competition in the final goods market.

In separate regressions (not shown) we ran the import variables without

[1] Feldstein (1974) proposes a composite estimator which might apply in this context.

controlling for imported inputs. Results for California varied from positive and significant to negative and significant depending upon the specification. In RUSA, the results were more uniformly negative, although the significance varied.

Conclusions

1) During the period 1982-1994, the real wages of California's blue collar workers declined by 3.2%, while those of white collar workers increased by 21.6%
2) There has been a 3% drop in the share of blue collar workers in total number of employees in CA, in manufacturing, between the years 1982 and 1994.
3) The greatest drop has been in some high-tech industries like guided missiles, computers, publishing etc. At the same time there has been an increase in the share of blue collar workers in some industries, like chemicals, refining etc.
4) In terms of change in payroll shares of blue collar workers there was a 15% decrease over the same period 1982-94.
5) Greatest decreases were again concentrated in the high-tech sectors and the increases in chemicals, textile products etc.
6) CA and the Rest of the US are different in terms of the adjustment of the labor market in response to various factors. Even though on the whole there is a similar process at work in both the regions, to wit – a drop in the payroll share of blue collar workers, the SIC codes across which this process takes place are very different, particularly for the period 1987-92. The process is 50% to 100% more acute in California.
7) Changes in the share of nonenergy materials that are imported account for about a quarter of the decline in the relative demand for blue collar workers observed in the Californian manufacturing sectors from 1987-1992.
8) Sectors experiencing greater declines in sales are more apt to restructure their productive processes in the forgoing manner. Whether this restructuring occurs within plants or is the result of higher closures among plants with obsolete technologies is not revealed by our data.

9) In contrast, conventionally-defined import competition, or changes in the share of the product market that are imported from abroad, appear to have no effect on our inequality measure, once changes in imported inputs are accounted for.

10) If we do not account for imported inputs, changes in imports which compete in the output market appear to significantly affect our inequality measure, although not in a consistent fashion. Thus, not properly controlling for imported inputs can lead to misleading evaluations of the effect of trade on inequality.

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TABLE 1

California: Production Workers' Share in Total Employees

SIC	Description	1982	1987	1992	1994
	Average for CA	60.30%	58.93%	57.27%	58.52%
201	Meat Products	82.89%	78.29%	83.80%	85.38%
202	Dairy Products	62.75%	63.81%	66.92%	66.67%
203	Preserved Fruits and Vegetables	86.76%	85.03%	85.63%	85.39%
204	Grain Mill Products	66.67%	67.53%	69.86%	69.33%
205	Bakery Products	53.99%	56.77%	63.04%	62.24%
206	Sugar and Confectionery Products	83.72%	80.67%	79.28%	80.00%
207	Fats and Oils	66.67%	65.22%	66.67%	63.16%
208	Beverages	53.81%	51.05%	52.12%	52.87%
209	Misc. Food and Kindred Products	79.48%	75.58%	74.14%	71.93%
221	Broadwoven Fabric Mills, Cotton			100.00%	
222	Broadwoven Fabric Mills, Manmade			66.67%	
224	Narrow Fabric Mills			80.00%	
225	Knitting Mills	85.71%	80.39%	84.91%	87.50%
226	Textile Finishing, Except Wool	75.00%		77.78%	78.95%
227	Carpets and Rugs	62.16%	64.86%	71.88%	69.70%
228	Yarn and Thread Mills	92.31%		100.00%	
229	Miscellaneous Textile Goods	76.19%		69.23%	77.42%
231	Men's and Boys' Suits and Coats				
232	Men's and Boys' Furnishings	81.55%	83.69%	79.85%	77.50%
233	Women's and Misses' Outerwear	82.86%	81.49%	82.38%	84.38%
234	Women's and Children's Undergarr	82.00%	71.43%	77.14%	72.73%
235	Hats, Caps, and Millinery	85.71%		81.82%	
236	Girls' and Children's Outerwear	82.14%		80.33%	83.33%
237	Fur Goods				
238	Miscellaneous Apparel and Access	81.08%	81.58%	83.02%	75.00%
239	Misc. Fabricated Textile Products	83.98%	80.63%	79.22%	82.68%
241	Logging		86.54%	80.95%	80.85%
242	Sawmills and Planing Mills	86.99%	87.50%	87.20%	87.18%
243	Millwork, Plywood & Structural M	77.78%	79.75%	76.92%	77.23%
244	Wood Containers	83.33%	82.93%	78.26%	80.95%
245	Wood Buildings and Mobile Home	72.73%	78.43%	82.76%	83.33%
249	Miscellaneous Wood Products	79.76%	81.52%	81.93%	83.91%
251	Household Furniture	82.18%	83.72%	82.58%	83.81%
252	Office Furniture	79.31%	76.00%	73.33%	79.69%
253	Public Building & Related Furniture		77.78%	72.41%	72.00%
254	Partitions and Fixtures	74.67%	73.33%	71.83%	72.46%
259	Miscellaneous Furniture and Fixtur	75.00%	76.83%	64.10%	60.00%

TABLE 1

California: Production Workers' Share in Total Employees

SIC	Description	1982	1987	1992	1994
	Average for CA	60.30%	58.93%	57.27%	58.52%
261	Pulp Mills				
262	Paper Mills				
263	Paperboard Mills		75.00%	76.47%	75.00%
265	Paperboard Containers and Boxes	75.97%	76.02%	75.88%	86.19%
267	Misc. Converted Paper Products		76.32%	73.25%	73.08%
271	Newspapers		31.09%	27.98%	25.60%
272	Periodicals		18.89%	20.72%	17.50%
273	Books	41.10%	35.37%	33.68%	30.77%
274	Miscellaneous Publishing		41.67%	37.65%	34.12%
275	Commercial Printing	74.37%	72.44%	71.86%	71.28%
276	Manifold Business Forms		67.92%	67.44%	67.44%
277	Greeting Cards			66.67%	
278	Blankbooks and Bookbinding	82.26%		80.49%	77.38%
279	Printing Trade Services	75.44%	72.50%	68.00%	74.67%
281	Industrial Inorganic Chemicals	56.10%		58.54%	54.05%
282	Plastics Materials and Synthetics	58.33%		55.00%	55.56%
283	Drugs	46.98%	38.27%	36.44%	39.78%
284	Soap, Cleaners, and Toilet Goods	61.06%	58.33%	59.52%	58.97%
285	Paints and Allied Products		50.00%	50.00%	51.92%
286	Industrial Organic Chemicals	57.14%	45.71%	66.67%	58.82%
287	Agricultural Chemicals	62.96%	55.56%	55.56%	58.33%
289	Miscellaneous Chemical Products	58.23%	58.57%	56.16%	71.15%
291	Petroleum Refining		62.93%	62.07%	65.49%
295	Asphalt Paving and Roofing Materi	73.08%	69.57%	71.43%	70.37%
299	Misc. Petroleum and Coal Products	47.06%	58.33%	54.55%	66.67%
301	Tires and Inner Tubes				
302	Rubber and Plastics Footwear				
305	Hose & Belting & Gaskets & Packing		69.70%	68.29%	66.67%
306	Fabricated Rubber Products, NEC		74.39%	72.29%	72.37%
308	Miscellaneous Plastics Products, NEC		75.23%	73.86%	75.47%
311	Leather Tanning and Finishing			85.71%	
313	Footwear Cut Stock			100.00%	
314	Footwear, Except Rubber	88.37%		83.33%	88.89%
316	Luggage		75.00%	80.00%	83.33%
317	Handbags and Personal Leather Go	84.21%		70.00%	
319	Leather Goods, NEC			80.00%	81.82%
321	Flat Glass		75.00%	76.92%	83.33%

TABLE 1

California: Production Workers' Share in Total Employees

SIC	Description	1982	1987	1992	1994
	Average for CA	60.30%	58.93%	57.27%	58.52%
365	Household Audio and Video Equip	66.29%	70.27%	63.10%	71.43%
366	Communications Equipment	45.23%	33.41%	35.73%	40.63%
367	Electronic Components and Acces:	60.84%	57.17%	56.72%	58.04%
369	Misc. Electrical Equipment & Supp	59.42%	58.97%	60.81%	59.81%
371	Motor Vehicles and Equipment	76.04%	78.82%	78.60%	79.66%
372	Aircraft and Parts	53.02%	56.08%	52.43%	48.59%
373	Ship and Boat Building and Repairi	86.05%		80.31%	77.78%
374	Railroad Equipment				
375	Motorcycles, Bicycles, and Parts		73.33%		
376	Guided Missiles, Space Vehicles, P:	37.06%	33.01%	21.20%	19.61%
379	Miscellaneous Transportation Equi	63.64%		63.24%	67.69%
381	Search and Navigation Equipment		41.81%	37.19%	37.84%
382	Measuring and Controlling Devices	48.84%	51.84%	45.22%	47.28%
384	Medical Instruments and Supplies	64.50%	52.35%	50.11%	50.55%
385	Ophthalmic Goods			71.05%	63.89%
386	Photographic Equipment and Supplies		55.56%	42.42%	55.32%
387	Watches, Clocks, Watchcases & Parts			100.00%	
391	Jewelry, Silverware, and Plated Wa	64.71%	70.27%	70.27%	75.00%
393	Musical Instruments			72.22%	68.75%
394	Toys and Sporting Goods	73.77%	69.07%	67.31%	72.00%
395	Pens, Pencils, Office, & Art Supplie	75.00%	70.45%	69.23%	60.98%
396	Costume Jewelry and Notions	77.27%		72.00%	69.23%
399	Miscellaneous Manufactures	70.75%	70.76%	63.09%	64.10%

Table 2

California:Percentage Change in Share of Production Workers in Total Employees
1982-87, 1987-94 & 1982-1994

		1982-87	1987-94	1982-94
	Average for CA	-2.27%	-0.70%	-2.95%
SICKEY				
254	Partitions and Fixtures	-1.79%	-1.19%	-2.95%
259	Miscellaneous Furniture and Fixtur	2.44%	-21.90%	-20.00%
261	Pulp Mills			
262	Paper Mills			
263	Paperboard Mills		0.00%	
265	Paperboard Containers and Boxes	0.06%	13.37%	13.44%
267	Misc. Converted Paper Products		-4.24%	
271	Newspapers		-17.68%	
272	Periodicals		-7.35%	
273	Books	-13.94%	-13.00%	-25.13%
274	Miscellaneous Publishing		-18.12%	
275	Commercial Printing	-2.59%	-1.61%	-4.16%
276	Manifold Business Forms		-0.71%	
277	Greeting Cards			
278	Blankbooks and Bookbinding			-5.93%
279	Printing Trade Services	-3.90%	2.99%	-1.02%
281	Industrial Inorganic Chemicals			-3.64%
282	Plastics Materials and Synthetics			-4.76%
283	Drugs	-18.55%	3.95%	-15.33%
284	Soap, Cleaners, and Toilet Goods	-4.47%	1.10%	-3.42%
285	Paints and Allied Products		3.85%	
286	Industrial Organic Chemicals	-20.00%	28.68%	2.94%
287	Agricultural Chemicals	-11.76%	5.00%	-7.35%
289	Miscellaneous Chemical Products	0.59%	21.48%	22.20%
291	Petroleum Refining		4.06%	
295	Asphalt Paving and Roofing Materi	-4.81%	1.16%	-3.70%
299	Misc. Petroleum and Coal Products	23.96%	14.29%	41.67%
301	Tires and Inner Tubes			
302	Rubber and Plastics Footwear			
305	Hose & Belting & Gaskets & Packi		-4.35%	
306	Fabricated Rubber Products, NEC		-2.72%	
308	Miscellaneous Plastics Products, Nl		0.32%	
311	Leather Tanning and Finishing			
313	Footwear Cut Stock			
314	Footwear, Except Rubber			0.58%

Table 2

California:Percentage Change in Share of Production Workers in Total Employees
1982-87, 1987-94 & 1982-1994

		1982-87	1987-94	1982-94
	Average for CA	-2.27%	-0.70%	-2.95%
SICKEY				
358	Refrigeration and Service Machiner	3.14%	-1.53%	1.56%
359	Industrial Machinery, NEC	-5.86%	0.29%	-5.59%
361	Electric Distribution Equipment	-2.57%	5.38%	2.67%
362	Electrical Industrial Apparatus	-1.86%	5.77%	3.80%
363	Household Appliances	-0.82%	2.48%	1.65%
364	Electric Lighting and Wiring Equipı	-3.41%	-3.09%	-6.40%
365	Household Audio and Video Equip	6.00%	1.65%	7.75%
366	Communications Equipment	-26.14%	21.63%	-10.16%
367	Electronic Components and Acces:	-6.03%	1.52%	-4.60%
369	Misc. Electrical Equipment & Supp	-0.75%	1.42%	0.66%
371	Motor Vehicles and Equipment	3.66%	1.06%	4.76%
372	Aircraft and Parts	5.76%	-13.35%	-8.36%
373	Ship and Boat Building and Repairi			-9.61%
374	Railroad Equipment			
375	Motorcycles, Bicycles, and Parts			
376	Guided Missiles, Space Vehicles, P:	-10.92%	-40.58%	-47.07%
379	Miscellaneous Transportation Equij			6.37%
381	Search and Navigation Equipment		-9.50%	
382	Measuring and Controlling Devices	6.15%	-8.81%	-3.20%
384	Medical Instruments and Supplies	-18.84%	-3.44%	-21.63%
385	Ophthalmic Goods			
386	Photographic Equipment and Supp		-0.43%	
387	Watches, Clocks, Watchcases & Pa			
391	Jewelry, Silverware, and Plated Wa	8.60%	6.73%	15.91%
393	Musical Instruments			
394	Toys and Sporting Goods	-6.37%	4.24%	-2.40%
395	Pens, Pencils, Office, & Art Supplie	-6.06%	-13.45%	-18.70%
396	Costume Jewelry and Notions			-10.41%
399	Miscellaneous Manufactures	0.02%	-9.41%	-9.39%

Table 2A

California:Percentage Change in Share of Production Workers in Total Employees
1982-87, 1987-94 & 1982-1994

Ranked in Ascending Order for 1987-1994

SICKEY		1982-94	1982-87	1987-94
	Average for CA	-2.95%	-2.27%	-0.70%
244	Wood Containers	-2.86%	-0.49%	-2.38%
275	Commercial Printing	-4.16%	-2.59%	-1.61%
358	Refrigeration and Service Machiner	1.56%	3.14%	-1.53%
254	Partitions and Fixtures	-2.95%	-1.79%	-1.19%
206	Sugar and Confectionery Products	-4.44%	-3.64%	-0.83%
276	Manifold Business Forms			-0.71%
331	Blast Furnace and Basic Steel Prodi	1.16%	1.65%	-0.49%
386	Photographic Equipment and Supplies			-0.43%
242	Sawmills and Planing Mills	0.22%	0.59%	-0.37%
323	Products of Purchased Glass			-0.12%
263	Paperboard Mills			0.00%
251	Household Furniture	1.98%	1.88%	0.10%
335	Nonferrous Rolling and Drawing	4.01%	3.86%	0.14%
359	Industrial Machinery, NEC	-5.59%	-5.86%	0.29%
308	Miscellaneous Plastics Products, NEC			0.32%
345	Screw Machine Products, Bolts, Et	4.11%	3.71%	0.39%
203	Preserved Fruits and Vegetables	-1.59%	-1.99%	0.42%
371	Motor Vehicles and Equipment	4.76%	3.66%	1.06%
284	Soap, Cleaners, and Toilet Goods	-3.42%	-4.47%	1.10%
295	Asphalt Paving and Roofing Materi	-3.70%	-4.81%	1.16%
347	Metal Services, NEC	0.58%	-0.78%	1.37%
369	Misc. Electrical Equipment & Supp	0.66%	-0.75%	1.42%
367	Electronic Components and Access	-4.60%	-6.03%	1.52%
329	Misc. Nonmetallic Mineral Product	-0.12%	-1.71%	1.63%
354	Metalworking Machinery	2.25%	0.62%	1.63%
365	Household Audio and Video Equip	7.75%	6.00%	1.65%
341	Metal Cans and Shipping Containe	2.31%	0.58%	1.72%
234	Women's and Children's Undergarr	-11.31%	-12.89%	1.82%
322	Glass and Glassware, Pressed or Bl	2.40%	0.07%	2.33%
363	Household Appliances	1.65%	-0.82%	2.48%
239	Misc. Fabricated Textile Products	-1.54%	-3.99%	2.55%
204	Grain Mill Products	4.00%	1.30%	2.67%
249	Miscellaneous Wood Products	5.20%	2.21%	2.93%
279	Printing Trade Services	-1.02%	-3.90%	2.99%
233	Women's and Misses' Outerwear	1.83%	-1.65%	3.54%

TABLE 3

California: Payroll Share of Production Workers

		1982	1987	1992	1994
		Payroll Share	Payroll Share	Payroll Share	Payroll Share
CA Average		**48.23%**	**44.96%**	**41.17%**	**40.75%**
SICKEY					
259	Miscellaneous Furniture and Fixtur	61.89%	62.72%	51.02%	47.50%
261	Pulp Mills				
262	Paper Mills				
263	Paperboard Mills		76.54%	71.91%	69.38%
265	Paperboard Containers and Boxes	68.89%	68.57%	65.79%	68.18%
267	Misc. Converted Paper Products		69.65%	65.24%	64.27%
271	Newspapers		32.75%	23.86%	23.39%
272	Periodicals		14.41%	13.18%	16.25%
273	Books	31.29%	26.64%	26.25%	25.19%
274	Miscellaneous Publishing		26.34%	26.37%	22.00%
275	Commercial Printing	67.56%	63.80%	63.03%	62.88%
276	Manifold Business Forms		65.66%	64.04%	62.51%
277	Greeting Cards			30.59%	
278	Blankbooks and Bookbinding	71.60%		68.73%	62.70%
279	Printing Trade Services	70.81%	65.43%	59.08%	67.55%
281	Industrial Inorganic Chemicals	50.61%		50.27%	49.82%
282	Plastics Materials and Synthetics	49.81%		45.03%	49.78%
283	Drugs	35.26%	23.61%	24.13%	24.88%
284	Soap, Cleaners, and Toilet Goods	53.45%	48.15%	43.42%	38.66%
285	Paints and Allied Products		40.71%	38.67%	40.45%
286	Industrial Organic Chemicals	53.94%	48.18%	58.38%	55.43%
287	Agricultural Chemicals	54.82%	48.10%	47.48%	49.05%
289	Miscellaneous Chemical Products	49.87%	46.34%	49.12%	57.19%
291	Petroleum Refining		59.18%	55.65%	61.39%
295	Asphalt Paving and Roofing Materi	67.97%	62.36%	68.42%	68.24%
299	Misc. Petroleum and Coal Products	37.06%	46.37%	46.70%	48.51%
301	Tires and Inner Tubes				
302	Rubber and Plastics Footwear				
305	Hose & Belting & Gaskets & Packing		59.95%	51.82%	58.42%
306	Fabricated Rubber Products, NEC		60.57%	60.00%	57.54%
308	Miscellaneous Plastics Products, NEC		58.25%	58.55%	58.89%
311	Leather Tanning and Finishing			77.06%	
313	Footwear Cut Stock			73.33%	
314	Footwear, Except Rubber	78.08%		68.26%	71.03%
316	Luggage		57.84%	63.36%	62.56%
317	Handbags and Personal Leather Gc	67.48%		53.59%	

TABLE 3

California: Payroll Share of Production Workers

		1982	1987	1992	1994
		Payroll Share	Payroll Share	Payroll Share	Payroll Share
CA Average		**48.23%**	**44.96%**	**41.17%**	**40.75%**
SICKEY					
362	Electrical Industrial Apparatus	47.07%	44.59%	41.18%	44.84%
363	Household Appliances	55.05%	60.53%	59.58%	54.00%
364	Electric Lighting and Wiring Equip:	59.82%	57.02%	50.26%	52.15%
365	Household Audio and Video Equip	47.20%	52.99%	52.54%	49.77%
366	Communications Equipment	36.79%	22.35%	22.98%	26.31%
367	Electronic Components and Acces:	46.41%	43.50%	38.33%	36.15%
369	Misc. Electrical Equipment & Supp	42.33%	43.89%	45.16%	43.86%
371	Motor Vehicles and Equipment	71.04%	72.43%	73.44%	72.26%
372	Aircraft and Parts	45.71%	46.97%	45.59%	38.63%
373	Ship and Boat Building and Repairi	76.87%		69.30%	68.90%
374	Railroad Equipment				
375	Motorcycles, Bicycles, and Parts		61.23%		
376	Guided Missiles, Space Vehicles, P	30.05%	26.84%	16.49%	16.02%
379	Miscellaneous Transportation Equi	55.65%		56.14%	55.22%
381	Search and Navigation Equipment		36.66%	30.11%	28.89%
382	Measuring and Controlling Devices	37.22%	40.85%	33.63%	33.76%
384	Medical Instruments and Supplies	46.66%	34.95%	31.53%	31.61%
385	Ophthalmic Goods			59.28%	51.87%
386	Photographic Equipment and Supplies		43.98%	29.46%	43.65%
387	Watches, Clocks, Watchcases & Parts			61.40%	
391	Jewelry, Silverware, and Plated Wa	53.74%	55.20%	55.66%	57.53%
393	Musical Instruments			58.23%	52.35%
394	Toys and Sporting Goods	57.00%	52.84%	45.36%	50.25%
395	Pens, Pencils, Office, & Art Supplie	64.65%		50.52%	43.23%
396	Costume Jewelry and Notions	64.96%		61.76%	58.22%
399	Miscellaneous Manufactures	57.17%		47.97%	50.84%

Table 4

California: Percentage Change in Payroll Share of Production Employees

		1982-87	1987-94	1982-94
	Average for CA	-6.78%	-9.36%	-15.51%
SIC	***Description***			
254	Partitions and Fixtures	-5.12%	-9.20%	-13.85%
259	Miscellaneous Furniture and Fixtur	1.34%	-24.27%	-23.25%
261	Pulp Mills			
262	Paper Mills			
263	Paperboard Mills		-9.36%	
265	Paperboard Containers and Boxes	-0.45%	-0.57%	-1.03%
267	Misc. Converted Paper Products		-7.72%	
271	Newspapers		-28.59%	
272	Periodicals		12.75%	
273	Books	-14.88%	-5.44%	-19.52%
274	Miscellaneous Publishing		-16.46%	
275	Commercial Printing	-5.57%	-1.43%	-6.92%
276	Manifold Business Forms		-4.80%	
277	Greeting Cards			
278	Blankbooks and Bookbinding			-12.43%
279	Printing Trade Services	-7.60%	3.24%	-4.60%
281	Industrial Inorganic Chemicals			-1.56%
282	Plastics Materials and Synthetics			-0.06%
283	Drugs	-33.06%	5.41%	-29.43%
284	Soap, Cleaners, and Toilet Goods	-9.92%	-19.72%	-27.68%
285	Paints and Allied Products		-0.64%	
286	Industrial Organic Chemicals	-10.68%	15.05%	2.77%
287	Agricultural Chemicals	-12.26%	1.97%	-10.53%
289	Miscellaneous Chemical Products	-7.08%	23.40%	14.67%
291	Petroleum Refining		3.74%	
295	Asphalt Paving and Roofing Materi	-8.26%	9.42%	0.39%
299	Misc. Petroleum and Coal Products	25.13%	4.62%	30.91%
301	Tires and Inner Tubes			
302	Rubber and Plastics Footwear			
305	Hose & Belting & Gaskets & Packing		-2.55%	
306	Fabricated Rubber Products, NEC		-5.01%	
308	Miscellaneous Plastics Products, NEC		1.09%	
311	Leather Tanning and Finishing			
313	Footwear Cut Stock			
314	Footwear, Except Rubber			-9.02%

Table 4

California: Percentage Change in Payroll Share of Production Employees

SIC	Description	1982-87	1987-94	1982-94
	Average for CA	-6.78%	-9.36%	-15.51%
358	Refrigeration and Service Machiner	0.41%	-13.27%	-12.91%
359	Industrial Machinery, NEC	-9.24%	1.88%	-7.54%
361	Electric Distribution Equipment	4.13%	-16.20%	-12.74%
362	Electrical Industrial Apparatus	-5.28%	0.56%	-4.75%
363	Household Appliances	9.95%	-10.79%	-1.91%
364	Electric Lighting and Wiring Equipr	-4.68%	-8.55%	-12.83%
365	Household Audio and Video Equip	12.27%	-6.09%	5.43%
366	Communications Equipment	-39.26%	17.73%	-28.49%
367	Electronic Components and Access	-6.26%	-16.91%	-22.12%
369	Misc. Electrical Equipment & Supp	3.68%	-0.07%	3.61%
371	Motor Vehicles and Equipment	1.96%	-0.24%	1.72%
372	Aircraft and Parts	2.74%	-17.76%	-15.50%
373	Ship and Boat Building and Repairing			-10.37%
374	Railroad Equipment			
375	Motorcycles, Bicycles, and Parts			
376	Guided Missiles, Space Vehicles, Pa	-10.69%	-40.33%	-46.71%
379	Miscellaneous Transportation Equipment			-0.78%
381	Search and Navigation Equipment		-21.20%	
382	Measuring and Controlling Devices	9.76%	-17.35%	-9.29%
384	Medical Instruments and Supplies	-25.09%	-9.57%	-32.26%
385	Ophthalmic Goods			
386	Photographic Equipment and Supplies		-0.75%	
387	Watches, Clocks, Watchcases & Parts			
391	Jewelry, Silverware, and Plated Wa	2.71%	4.22%	7.05%
393	Musical Instruments			
394	Toys and Sporting Goods	-7.30%	-4.90%	-11.84%
395	Pens, Pencils, Office, & Art Supplies			-33.13%
396	Costume Jewelry and Notions			-10.38%
399	Miscellaneous Manufactures			-11.07%

Table 4A

California: Percentage Change in Payroll Share of Production Employees
Ranked in Ascending Order for Years 1987-1994

SIC	Description	1982-94	1982-87	1987-94
	Average for CA	-15.51%	-6.78%	-9.36%
244	Wood Containers	-10.74%	-5.97%	-5.07%
306	Fabricated Rubber Products, NEC			-5.01%
206	Sugar and Confectionery Products	-6.46%	-1.58%	-4.96%
394	Toys and Sporting Goods	-11.84%	-7.30%	-4.90%
276	Manifold Business Forms			-4.80%
351	Engines and Turbines	-10.18%	-6.27%	-4.18%
241	Logging			-4.14%
243	Millwork, Plywood & Structural Me	-8.86%	-4.93%	-4.13%
356	General Industrial Machinery	-9.92%	-6.23%	-3.94%
242	Sawmills and Planing Mills	-2.81%	0.31%	-3.10%
323	Products of Purchased Glass			-2.94%
324	Cement, Hydraulic			-2.90%
305	Hose & Belting & Gaskets & Packing			-2.55%
335	Nonferrous Rolling and Drawing	0.14%	2.65%	-2.45%
207	Fats and Oils	-4.90%	-2.85%	-2.10%
329	Misc. Nonmetallic Mineral Products	1.69%	3.55%	-1.80%
203	Preserved Fruits and Vegetables	-6.18%	-4.60%	-1.65%
354	Metalworking Machinery	-4.70%	-3.12%	-1.63%
249	Miscellaneous Wood Products	-1.12%	0.50%	-1.61%
275	Commercial Printing	-6.92%	-5.57%	-1.43%
208	Beverages	-4.34%	-3.46%	-0.90%
251	Household Furniture	0.07%	0.98%	-0.90%
386	Photographic Equipment and Supplies			-0.75%
285	Paints and Allied Products			-0.64%
265	Paperboard Containers and Boxes	-1.03%	-0.45%	-0.57%
371	Motor Vehicles and Equipment	1.72%	1.96%	-0.24%
369	Misc. Electrical Equipment & Supp	3.61%	3.68%	-0.07%
252	Office Furniture	-1.39%	-1.55%	0.16%
362	Electrical Industrial Apparatus	-4.75%	-5.28%	0.56%
308	Miscellaneous Plastics Products, NEC			1.09%
341	Metal Cans and Shipping Containe	-2.12%	-3.62%	1.56%
227	Carpets and Rugs	0.94%	-0.62%	1.57%
202	Dairy Products	1.16%	-0.43%	1.60%
359	Industrial Machinery, NEC	-7.54%	-9.24%	1.88%
347	Metal Services, NEC	0.25%	-1.62%	1.90%

Table 3 715

Date: 09/05/97 Time: 15:25
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	CAWGSHR82	CAWGSHR94
Mean	60.51571	55.78154
Median	63.46000	57.53000
Maximum	83.59000	83.91000
Minimum	29.85000	0.000000
Std. Dev.	12.63365	15.31509
Skewness	-0.538463	-1.007877
Kurtosis	2.635671	4.211840
Jarque-Bera	4.900747	20.97484
Probability	0.086261	0.000028
Observations	91	91

TABLE 5

California: Individual Wages, Production and Non-Production Workers

Current Dollars

	1982			1987			1994		
ICKEY	Prod.	NonProd.	Ratio	Production	NonProductior	Ratio	Prod.	NonProd	Ratio
74				14342.86	28653.06	0.50	18103.45	33232.14	0.54
75	16635.59	23180.33	0.72	19818.18	29566.04	0.67	25972.64	38043.21	0.68
76				24750.00	27411.76	0.90	28172.41	35000.00	0.80
78	13000.00	23909.09	0.54				18153.85	36947.37	0.49
79	19744.19	25000.00	0.79	25258.62	35181.82	0.72	34053.57	48210.53	0.71
31	23304.35	29055.56	0.80				35400.00	41941.18	0.84
32	18857.14	26600.00	0.71				34300.00	43250.00	0.79
33	15657.14	25468.35	0.61	18920.00	37950.41	0.50	27140.19	54111.11	0.50
34	17043.48	23272.73	0.73	20285.71	30577.78	0.66	18130.43	41354.17	0.44
35				22593.75	32906.25	0.69	26111.11	41520.00	0.63
36	22687.50	25833.33	0.88	32250.00	29210.53	1.10	34200.00	39285.71	0.87
37	20058.82	28100.00	0.71	24100.00	32500.00	0.74	35071.43	51000.00	0.69
39	16891.30	23666.67	0.71	21317.07	34896.55	0.61	29783.78	55000.00	0.54
91				37315.07	43697.67	0.85	51337.84	61256.41	0.84
95	22789.47	29142.86	0.78	32000.00	44142.86	0.72	41157.89	45500.00	0.90
99	17000.00	25666.67	0.66	23714.29	38400.00	0.62	26500.00	56250.00	0.47
02									
05				19913.04	30600.00	0.65	24291.67	34583.33	0.70
06				16065.57	30380.95	0.53	16727.27	32333.33	0.52
08				16104.42	35048.78	0.46	21141.49	45411.76	0.47
14	9842.11	21000.00	0.47				12875.00	42000.00	0.31
16				11888.89	26000.00	0.46	13450.00	40250.00	0.33
19							14000.00	34500.00	0.41
21				31777.78	32000.00	0.99	35700.00	51500.00	0.69
22	21425.29	29153.85	0.73	25770.27	38363.64	0.67	32775.51	51333.33	0.64
23				16789.47	30461.54	0.55	20625.00	40181.82	0.51
24				30333.33	47200.00	0.64	38384.62	47400.00	0.81
25	15687.50	26333.33	0.60				19769.23	36000.00	0.55
26	11860.47	18444.44	0.64	13027.03	23500.00	0.55	16771.43	34333.33	0.49
27	19676.47	26333.33	0.75	26076.39	33277.78	0.78	28773.44	38641.03	0.74
29	17428.57	24565.22	0.71	24138.89	28714.29	0.84	29766.67	39727.27	0.75
31	30988.64	34666.67	0.89	28617.02	31866.67	0.90	38162.79	57428.57	0.66
32	14313.43	29333.33	0.49	16979.17	38916.67	0.44	24162.16	50000.00	0.48
34				19909.09	32250.00	0.62	30545.45	50666.67	0.60
35	19142.86	27086.96	0.71	22528.57	34227.27	0.66	27250.00	44866.67	0.61
36	15042.25	29357.14	0.51	17027.03	34294.12	0.50	21695.65	41615.38	0.52
39	16250.00	31400.00	0.52				27000.00	46500.00	0.58

TABLE 5

California: Individual Wages, Production and Non-Production Workers

Current Dollars

	1982			1987			1994		
CKEY	Prod.	NonProd.	Ratio	Production	NonProductior	Ratio	Prod.	NonProd	Ratio
1	12409.09	19583.33	0.63	15115.38	29000.00	0.52	14939.39	33090.91	0.45
3							17181.82	34400.00	0.50
4	10677.78	22656.25	0.47	12223.88	24366.67	0.50	16733.33	42600.00	0.39
5	13900.00	22800.00	0.61	19451.61	28615.38	0.68	18520.00	38000.00	0.49
6	9705.88	17800.00	0.55				15944.44	25750.00	0.62
9	13144.23	23813.95	0.55	15578.51	30460.00	0.51	18710.00	32303.57	0.58

TABLE 6

Percentage Change in Real Wages(Adjusted by CA Urban CPI)
Production & Non-Production Workers: 1982-1994

		Production Wo	Non-Production Workers
CA Weighted Average		-3.20%	21.60%
CA Median		-0.99%	13.38%
SIC			
201	Meat Products	-18.57%	12.85%
202	Dairy Products	-2.49%	12.33%
203	Preserved Fruits and Vegetables	-5.96%	11.48%
204	Grain Mill Products	-1.07%	30.43%
205	Bakery Products	-16.87%	0.11%
206	Sugar and Confectionery Products	8.25%	7.14%
207	Fats and Oils	4.65%	1.29%
208	Beverages	-1.45%	3.58%
209	Misc. Food and Kindred Products	-8.71%	3.11%
221	Broadwoven Fabric Mills, Cotton		
222	Broadwoven Fabric Mills, Manmade		
224	Narrow Fabric Mills		
225	Knitting Mills	13.09%	67.42%
226	Textile Finishing, Except Wool	16.45%	15.44%
227	Carpets and Rugs	-7.88%	26.81%
228	Yarn and Thread Mills		
229	Miscellaneous Textile Goods	-2.09%	8.02%
231	Men's and Boys' Suits and Coats		
232	Men's and Boys' Furnishings	-1.89%	30.00%
233	Women's and Misses' Outerwear	-2.61%	6.31%
234	Women's and Children's Undergarı	15.45%	-32.40%
235	Hats, Caps, and Millinery		
236	Girls' and Children's Outerwear	49.27%	66.46%
237	Fur Goods		
238	Miscellaneous Apparel and Access	14.06%	41.90%
239	Misc. Fabricated Textile Products	7.47%	-12.98%
241	Logging		
242	Sawmills and Planing Mills	-1.01%	18.43%
243	Millwork, Plywood & Structural M	-13.53%	15.40%
244	Wood Containers	-4.58%	18.50%
245	Wood Buildings and Mobile Home	-3.47%	31.87%
249	Miscellaneous Wood Products	-12.92%	19.47%
251	Household Furniture	-7.53%	3.51%
252	Office Furniture	8.10%	15.43%

TABLE 6

Percentage Change in Real Wages(Adjusted by CA Urban CPI)
Production & Non-Production Workers: 1982-1994

		Production W	Non-Production Workers
253	Public Building & Related Furnit		
254	Partitions and Fixtures	-13.24%	15.34%
259	Miscellaneous Furniture and Fixt	7.24%	-3.75%
261	Pulp Mills		
262	Paper Mills		
263	Paperboard Mills		
265	Paperboard Containers and Boxe	-12.77%	77.87%
267	Misc. Converted Paper Products		
271	Newspapers		
272	Periodicals		
273	Books	44.88%	24.87%
274	Miscellaneous Publishing		
275	Commercial Printing	6.21%	11.65%
276	Manifold Business Forms		
277	Greeting Cards		
278	Blankbooks and Bookbinding	-5.00%	5.12%
279	Printing Trade Services	17.33%	31.19%
281	Industrial Inorganic Chemicals	3.34%	-1.80%
282	Plastics Materials and Synthetics	23.74%	10.61%
283	Drugs	17.92%	44.53%
284	Soap, Cleaners, and Toilet Goods	-27.63%	20.88%
285	Paints and Allied Products		
286	Industrial Organic Chemicals	2.55%	3.45%
287	Agricultural Chemicals	18.94%	23.47%
289	Miscellaneous Chemical Product	19.95%	58.09%
291	Petroleum Refining		
295	Asphalt Paving and Roofing Mat	22.86%	6.21%
299	Misc. Petroleum and Coal Produ	6.04%	49.09%
301	Tires and Inner Tubes		
302	Rubber and Plastics Footwear		
305	Hose & Belting & Gaskets & Pac		
306	Fabricated Rubber Products, NE		
308	Miscellaneous Plastics Products,		
311	Leather Tanning and Finishing		
313	Footwear Cut Stock		
314	Footwear, Except Rubber	-11.01%	36.05%
316	Luggage		

TABLE 6

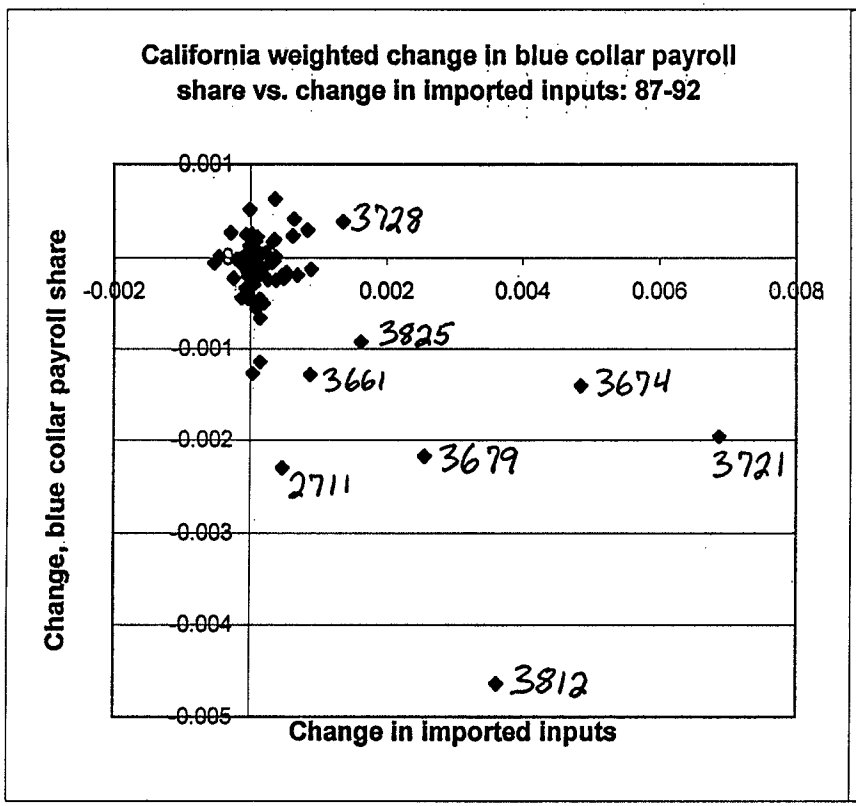
Percentage Change in Real Wages(Adjusted by CA Urban CPI)
Production & Non-Production Workers: 1982-1994

		Production Wc	Non-Production Workers
362	Electrical Industrial Apparatus	6.59%	28.52%
363	Household Appliances	-6.41%	3.27%
364	Electric Lighting and Wiring Equ	12.36%	22.61%
365	Household Audio and Video Equ	23.73%	41.94%
366	Communications Equipment	-0.97%	33.80%
367	Electronic Components and Acc	4.58%	42.44%
369	Misc. Electrical Equipment & Su	21.50%	16.03%
371	Motor Vehicles and Equipment	-10.29%	4.25%
372	Aircraft and Parts	7.82%	20.79%
373	Ship and Boat Building and Repa	-20.76%	-32.54%
374	Railroad Equipment		
375	Motorcycles, Bicycles, and Parts		
376	Guided Missiles, Space Vehicles,	7.88%	0.72%
379	Miscellaneous Transportation Eq	-16.52%	1.71%
381	Search and Navigation Equipmer		
382	Measuring and Controlling Devic	18.82%	29.81%
384	Medical Instruments and Supplie	31.45%	39.99%
385	Ophthalmic Goods		
386	Photographic Equipment and Su		
387	Watches, Clocks, Watchcases &		
391	Jewelry, Silverware, and Plated V	-18.10%	14.95%
393	Musical Instruments		
394	Toys and Sporting Goods	6.61%	27.91%
395	Pens, Pencils, Office, & Art Supp	-9.36%	13.38%
396	Costume Jewelry and Notions	11.75%	-1.59%
399	Miscellaneous Manufactures	-3.17%	-7.72%

Figure 1

Basic Relationships

1987-92 n=218	Change: Production Payroll divided by total Payroll		Change: Foreign Materials divided by Total Materials	Cyclic Variable: DEPTH	
	CA	RUSA	US	CA	RUSA
Mean	-0.035	-0.016	0.0208	0.820	0.883
Median	-0.03	-0.0177	0.0134	0.837	0.898
Standard Deviation	0.0613	0.0292	0.0383	0.116	0.079



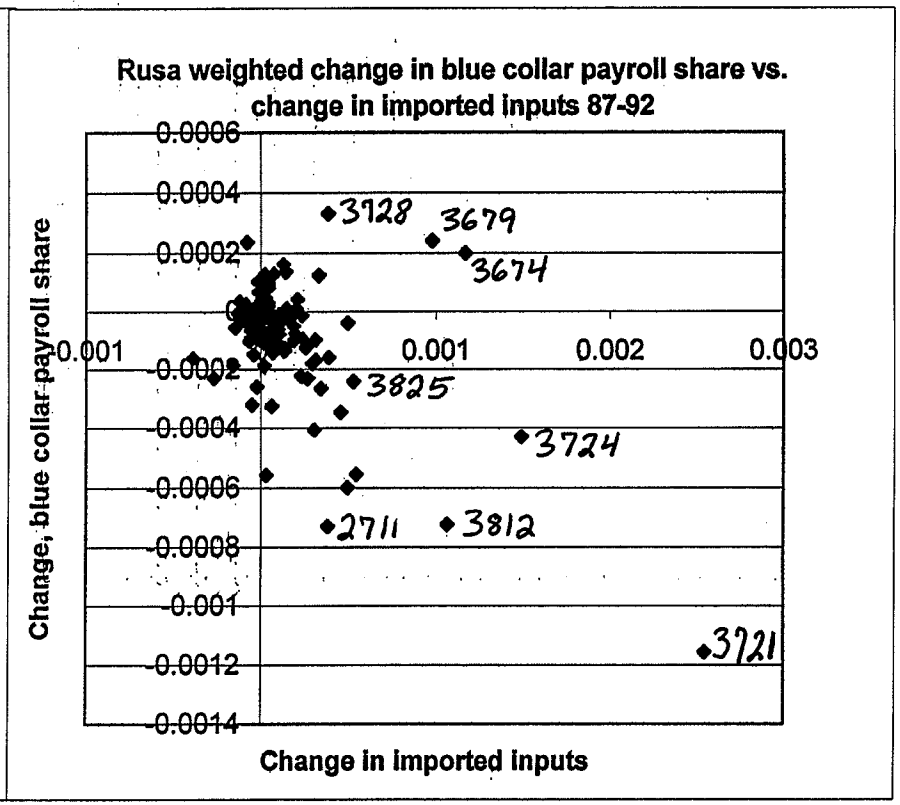


Figure 2

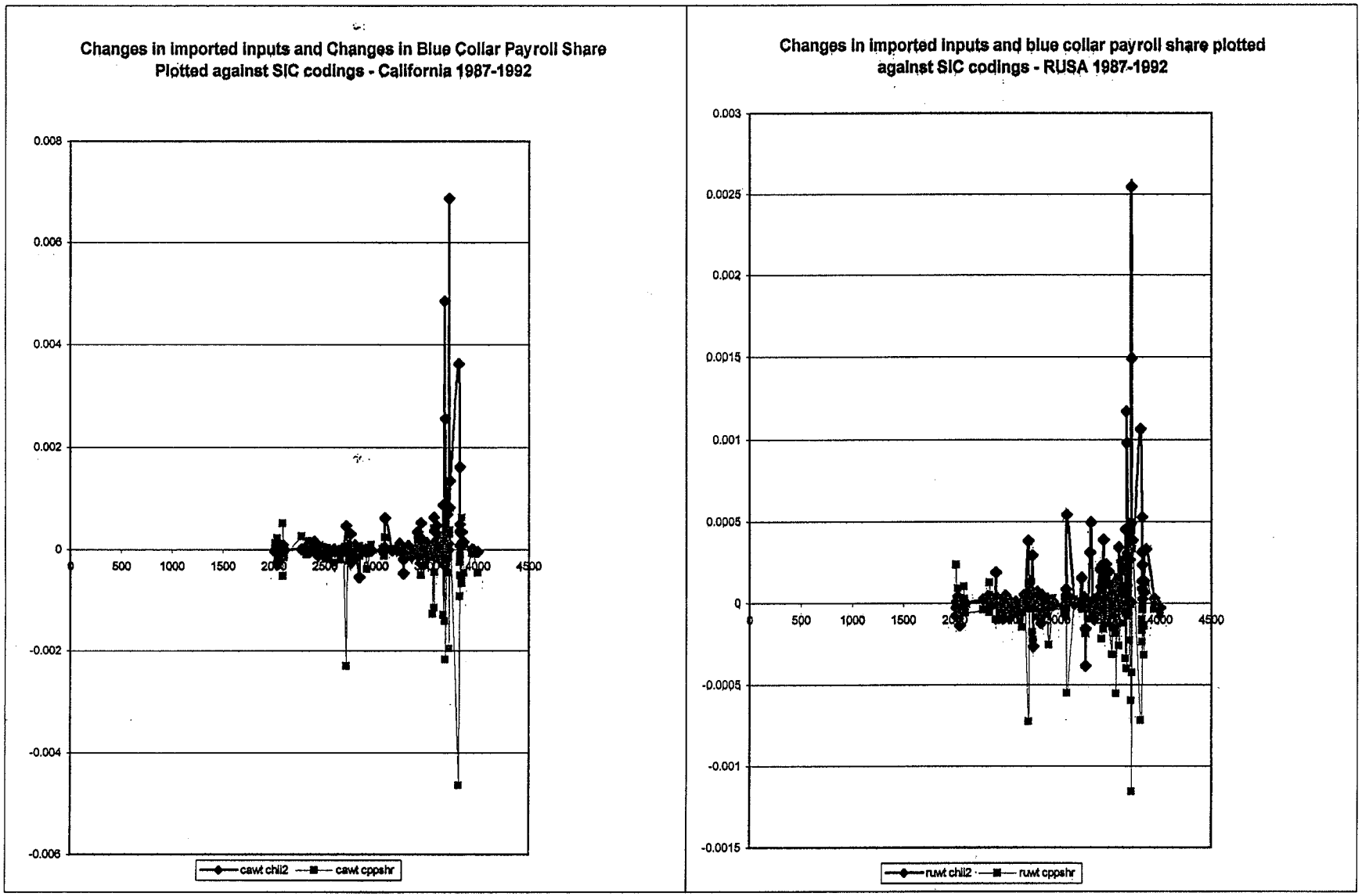

Changes in imported inputs and Changes in Blue Collar Payroll Share Plotted against SIC codings - California 1987-1992
0.008
0.006
0.004
0.002
0
-0.002
-0.004
-0.006
0
500
1000
1500
2000
2500
3000
3500
4000
4500
cawt chil2
cawt cppshr
Changes in imported inputs and blue collar payroll share plotted against SIC codings - RUSA 1987-1992
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
-0.0005
-0.001
-0.0015
0
500
1000
1500
2000
2500
3000
3500
4000
4500
ruwt chil2
ruwt cppshr

Table 7

Variable	California Results		RUSA Results	
Constant	6.6E-4 (2.7E-3)	1.1E-3 (2.3E-4)	3.7E-4 (9.3E-4)	4.6E-4 (9.4E-4)
Δ Imported Inputs (β1)	-.163** (.065)	-3.79** (.419)	-.019 (.046)	-1.29** (.425)
Δ K/Y (β2)	-.026 (.031)	.002 (.039)	-.024 (.017)	-.034** (.017)
92 Sales / Max(87-92 sales) (β3)	-.032** (.006)	.001 (.062)	-.020** (.003)	.047 (.040)
Depth: min(87-92 sales) / Max sales in years previous to min (β4)		-.02 (.064)		-.070 (.043)
Interaction: Depth * Δ Imported Inputs (β5)		3.90** (.450)		1.38** (.451)
F test (β1=β5=0)		43.7**		4.6**
Adj R2	.49	.64	.29	.32
N	218	218	217	217

Addenda: Evaluation of Interaction Term: d(Δ Blue Collar payroll share)/d(Δ Imported Inputs)

Evaluated at	Depth, CA	β1 + Depth*β5	Depth, RUSA	β1 + Depth*β5
Mean(Depth) – stdev(Depth)	.703	-1.051**(.113)	.803	-.180**(.076)
Mean(Depth)	.820	-.598**(.072)	.883	-.071(.053)
Mean(Depth) + stdev(Depth)	.936	-.146**(.055)	.962	.038(.049)

(Standard errors in parentheses), *Significant at 10%, **Significant at 5%.

Table 8 –
Effect on changes in the blue collar share of payroll,
Instrumental variables with change in export propensity of upstream industries as instruments.
Between 1987 and 1992, for California and the
Remainder of the United States (RUSA)

Variable		California Results		RUSA Results	
Constant		-1.8E-3 (2.7E-3)	1.2E-3 (2.8E-3)	8.3E-4 (1.0E-3)	1.7E-3 (1.2E-3)
Δ Imported Inputs	(β1)	-.327** (.130)	-4.74** (.510)	.249** (.085)	.141 (1.11)
Δ K/Y	(β2)	-.061 (.039)	.075 (.046)	-.032* (.018)	-.045** (.019)
92 Sales / Max(87-92 sales)	(β3)	-.019** (.010)	-.087 (.066)	-.029**	.127** (.051)
Depth: min(87-92 sales) / Max sales in years previous to min	(β4)		.065 (.067)		-.169** (.057)
Interaction: Depth * Δ Imported Inputs	(β5)		5.05** (.522)		.238 (.219)
Adj R2		.48	.63	.20	.18
N		218	218	217	217

Addenda: Evaluation of Interaction Term: d(Δ Blue Collar payroll share)/d(Δ Imported Inputs)				
Evaluated at	Depth, CA	β1 + Depth*β5	Depth, RUSA	β1 + Depth*β5
Mean(Depth) – stdev(Depth)	.703	-1.18** (.166)	.803	.333 (.249)
Mean(Depth)	.820	-.596** (.123)	.883	.352** (.172)
Mean(Depth) + stdev(Depth)	.936	-.009 (.100)	.962	.371** (.108)

(Standard errors in parentheses), *Significant at 10%, **Significant at 5%.

Table 9

Profile of SIC codes 3674 (Semiconductors) and 3679 (Electronic Components)

Unweighted (Changes for 1987-1992)	Semiconductors		Electronic Components	
	California	RUSA	California	RUSA
Change in share of blue collar payroll	-.033	.019	-.098	.028
Change in blue collar payroll ($1992, millions)	-66	110	-46	199
(percent change)	(-9%)	(6%)	(-8%)	(13%)
Change in white collar payroll ($1992, millions)	100	-51	203	19
(percent change)	(5%)	(-2%)	(6%)	(13%)
Change in blue collar employment	-3100	400	-800	12,700
Change in blue collar wages ($1992)	$940	$1595	-$1147	-$736
Change in white collar employment	-4800	-5200	2700	3197
Change in white collar wages ($1992)	$11,421	$3197	$5711	-$3510
Change in Sales ($1992)	8%	44%	50%	19%

	California – RUSA	California - RUSA
Blue Collar Wage Gap 1987 ($1992)	$2537	$2716
Blue Collar Wage Gap 1992	$1883	$2305
White Collar Wage Gap 1987 ($1992)	$774	-$1164
White Collar Wage Gap 1992	$8898	$8057

Table 10 –
Effect on changes in the blue collar share of wages and employment,
Between 1987 and 1992, for California and the
Remainder of the United States (RUSA)

Variable	California Wages		CA Employment		RUSA Wages		RUSA Employment	
	No Instruments	Instruments	No Instruments	Instruments	No Instruments	Instruments	No Instruments	Instruments
Constant	2.1E-3	-6.2E-3	7.9E-4	7.3E-3**	-4.1E-4.	1.0E-3	1.1E-3	2.7E-3**
	(4.3E-3)	(5.4E-3)	(2.1E-3)	(2.8E-3)	(9.6E-4)	(1.1E-3)	(7.4E-4)	(1.1E-3)
Δ Imported Inputs	-6.37**	-9.65**	-1.37**	-.971*	-2.44**	-1.99*	-.512	1.91*
	(.767)	(.993)	(.378)	(.509)	(.436)	(1.03)	(.335)	(1.00)
Δ K/Y	.236**	.188**	-.104**	.004	-.077**	-.084**	-.019	-.028
	(.072)	(.089)	(.035)	(.045)	(.017)	(.018)	(.013)	(.017)
92 Sales	-.452**	-.486**	.200**	.112*	.223**	.268**	.018	.103**
Max(87-92 sales)	(.113)	(.128)	(.056)	(.066)	(.041)	(.048)	(.032)	(.046)
Depth	.455**	.540**	-.233**	-.172**	-.260**	-.313**	-.031	-.136**
	(.118)	(.131)	(.058)	(.067)	(.044)	(.053)	(.034)	(.051)
Interaction:	6.83**	9.81**	1.36**	1.35**	2.65**	2.37**	.582	-1.58
Depth * Δ Imported Inputs	(.824)	(1.02)	(.406)	(.521)	(.462)	(1.01)	(.356)	(.981)
F-test (β1=β5=0)	34.4**		8.30**		16.6**		1.72*	
Adjusted R2	.39	.33	.57	.45	.43	.40	.14	.01
n	218	218	218	218	217	217	217	217

Addenda: Evaluation of Interaction Term: OLS	CA Wages	CA Employment		RUSA Wages	RUSA Employment	
	Depth, CA	β1+Depth*β6	β1 + Depth*β6	Depth, RUSA	β1 + Depth*β6	β1 + Depth*β6
Mean(Depth) – stdev(Depth)	.703	-1.56** (.207)	-.414** (.102)	.803	-.314** (.078)	-.045 (.060)
Mean(Depth)	.820	-.767** (.132)	-.256** (.065)	.883	-.104* (.055)	.002 (.042)
Mean(Depth) + stdev(Depth)	.936	.027 (.101)	-.098* (.050)	.962	.106** (.050)	.048 (.038)
Evaluation of Interaction Term: Instrumental Variables						
Mean(Depth) – stdev(Depth)	.703	-2.75** (.323)	-.023 (.165)	.803	-.086 (.231)	.642** (.225)
Mean(Depth)	.820	-1.61** (.239)	.134 (.123)	.883	.102 (.159)	.517** (.155)
Mean(Depth) + stdev(Depth)	.936	-.470** (.196)	.290** (.100)	.962	.290** (.101)	.392** (.098)

(Standard errors in parentheses), *Significant at 10%, **Significant at 5%

Table 11

Variable		California Results		RUSA Results	
Constant		-1.1E-3 (2.3E-3)	-6.7E-4 (2.4E-3)	4.7E-4 (9.4E-4)	6.1E-4 (9.5E-4)
Δ Imported Inputs	(β1)	-3.83** (.432)	-3.71** (.444)	-1.35** (.428)	-1.22** (.452)
Δ Imports	(β2)	-.016 (.041)	-1.11 (.912)	-.026 (.022)	-.280 (.286)
Δ K/Y	(β3)	.007 (.042)	.028 (.045)	-.032* (.017)	-.026 (.018)
92 Sales / Max(87-92 sales)	(β4)	.005 (.063)	.032 (.067)	.048 (.040)	.052 (.040)
Depth: min(87-92 sales) / Max sales in years previous to min	(β5)	-.024 (.065)	-.050 (.069)	-.071* (.043)	-.074* (.043)
Interaction: Depth * Δ Imported Inputs	(β6)	3.94** (.465)	3.79** (.480)	1.46** (.456)	1.31** (.486)
Interaction Depth * Δ Imports	(β7)		1.21 (1.01)		.275 (.310)
Adj R2		.64	.64	.32	.32
N		218	218	217	217

Addenda: Evaluation of Interaction Terms: second and fourth columns, above.				
Imported Input Interactions	Depth, CA	β1 + Depth*β6	Depth, RUSA	β1 + Depth*β6
Mean(Depth) – stdev(Depth)	.703	-1.04** (.116)	.803	-.171** (.077)
Mean(Depth)	.820	-.597** (.073)	.883	-.067 (.054)
Mean(Depth) + stdev(Depth)	.936	-.157** (.057)	.962	.037 (.054)
Import Competition Interactions	Depth, CA	β2 + Depth*β7	Depth, RUSA	β2 + Depth*β7
Mean(Depth) – stdev(Depth)	.703	-.258 (.206)	.803	-.058 (.042)
Mean(Depth)	.820	-.117 (.094)	.883	-.037 (.025)
Mean(Depth) + stdev(Depth)	.936	.023 (.052)	.962	-.015 (.025)

(Standard errors in parentheses), *Significant at 10%, **Significant at 5%.