

Appendices*
for
**Outsourcing and Wage Inequality in a Dynamic
Product Cycle Model**

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Appendix A

(not for publication, to be made available on the author's web site and also upon request)

1. Existence and uniqueness of equilibrium

We first assume the following for the limit values of the unit labor requirements. In the North, when $w^N \rightarrow 0$, the limit values are $a_{LN}(w^N) \rightarrow 0$ and $a_{HN}(w^N) \rightarrow \infty$, and when $w^N \rightarrow \infty$, the limit values are $a_{LN}(w^N) \rightarrow \infty$, $a_{HN}(w^N) \rightarrow 0$. In the South, when $w^S \rightarrow 0$, the limit values for are $a_{LF}(w^S) \rightarrow 0$, $a_{HF}(w^S) \rightarrow \infty$, and when $w^S \rightarrow \infty$, the limit values are $a_{LS}(w^S) \rightarrow \infty$, $a_{HS}(w^S) \rightarrow 0$. These assumptions are satisfied for constant returns to scale Cobb-Douglas production functions.

By equation (23) it follows that when $w^N \rightarrow \infty$, $\iota \rightarrow \iota_0 = [(a_k k(1 + \eta^S)/h^N) - (1/f) - (1/\delta)]^{-1}$ and when $w^N \rightarrow 0$, $\iota \rightarrow 0$. Using these and the above limit values for unit labor requirements, one can easily find the limit values for the SH and SL curves. On the SH curve, when $w^S \rightarrow 0$, $w^N \rightarrow \infty$ and when $w^S \rightarrow \infty$, $w^N \rightarrow 0$. On the SL curve, when $w^S \rightarrow 0$, $w^N \rightarrow 0$ and when $w^S \rightarrow \infty$, $w^N \rightarrow \infty$. Hence, as shown in Figure 1, there exists a unique intersection of the SH and SL curves, establishing strictly positive levels of $(w^N)^*$ and $(w^S)^*$.

Next we derive the parametric restrictions necessary for $E^* > 0$ and $\iota^* > 0$. Equation (22) implies that for $E^* > 0$, we need $a_{HN}/a_{LN} < h^N/(1 - h^N)$. Further, equation (23) implies that for $\iota^* > 0$, we need $a_{HN}/a_{LN} > [h_N/(1 - h_N)] - [a_k k/((1/f) + (1/\delta))(1 - h^N)]$. Combining the two conditions implies that for $E^* > 0$ and $\iota^* > 0$, we need $[h_N/(1 - h_N)] - [a_k k/((1/f) + (1/\delta))(1 - h^N)] < a_{HN}/a_{LN} < h_N/(1 - h_N)$.

We now show that equilibrium wage levels are strictly positive given strictly positive and unique values for E^* , ι^* , $(w^N)^*$ and $(w^S)^*$. For Southern wages, equation (12) establishes an inverse relationship between w_H^S and w_L^S . Hence, combining (12) with the Southern equilibrium relative wage $(w^S)^* = w_H^S/w_L^S$, one can show that $(w_H^S)^* > 0$ and $(w_L^S)^* > 0$. For Northern wages, given $E^* > 0$, equation (26) establishes an inverse relationship between w_H^N and w_L^N . Thus, combining (26) with the Northern equilibrium relative wage $(w^N)^* = w_H^N/w_L^N$, one can show that $(w_H^N)^* > 0$ and $(w_L^N)^* > 0$.

Finally, we restrict attention to steady-state outcomes where $\lambda > AC_N > AC_F > AC_S = 1$ and $v_F > v_N$. The latter implies $\pi_F/\pi_N > 1 + \delta/(\rho - n)$, which, in turn entails $(\lambda - AC^F)/(\lambda - AC^N) > \delta/\alpha(\rho - n)$. It appears to be analytically infeasible to derive certain parametric restrictions that satisfy all these

conditions. However, as shown by the simulations, there exist a large set of reasonable parameter values that satisfy the above conditions.

2. Comparative statics

We first restate SH and SL as:

$$SL(w^S, w^N; \alpha, f) = \frac{(1-h^N)[\alpha a_{HF}(w^S) + (\delta / t(w^N, \alpha, f))\lambda a_{HS}(w^S)]}{a_{LN}(w^N)[(\delta / f) + 1 - \alpha]} - h^S \eta^S = 0. \quad (\text{SH})$$

$$SH(w^S, w^N; \alpha, f) = \frac{(1-h^N)[\alpha a_{LF}(w^S) + (\delta / t(w^N, \alpha, f))\lambda a_{LS}(w^S)]}{a_{LN}(w^N)[(\delta / f) + 1 - \alpha]} - (1-h^S)\eta^S = 0 \quad (\text{SL})$$

The Jacobian matrix corresponding to the above equations is:

$$\begin{bmatrix} SH_{w^S} & SH_{w^N} \\ SL_{w^S} & SL_{w^N} \end{bmatrix} \begin{bmatrix} dw^S \\ dw^N \end{bmatrix} = \begin{bmatrix} -SH_\alpha & -SH_f \\ -SL_\alpha & -SL_f \end{bmatrix} \begin{bmatrix} d\alpha \\ df \end{bmatrix} \quad (\text{A1})$$

Let $A = (1-h^N)/[(\delta/f) + (1-\alpha)]a_{LN}(w^N)$, $B = \alpha a_{HF}(w^S) + \lambda \delta a_{HS}(w^S)/t(w^N; \alpha, f)$; $C = \alpha a_{LF}(w^S) + \lambda \delta a_{LS}(w^S)/t(w^N; \alpha, f)$. One can obtain

$$SH_{w^S} = AB_{w^S} < 0, \quad (\text{A.2})$$

$$SH_{w^N} = AB_{w^N} + BA_{w^N} < 0,$$

$$SL_{w^S} = AC_{w^S} > 0,$$

$$SL_{w^N} = AC_{w^N} + CA_{w^N} < 0,$$

$$SH_\alpha = B A_\alpha + A B_\alpha > 0,$$

$$SL_\alpha = C A_\alpha + A C_\alpha > 0,$$

$$SH_f = B A_f + A B_f > 0,$$

$$SL_f = C A_f + A C_f > 0,$$

It immediately follows from above that $\Delta = SH_{w^S}SL_{w^N} - SH_{w^N}SL_{w^S} > 0$.

2.1. Changes in α

Using Cramer's rule and (A.2) one can obtain:

$$\frac{dw^N}{d\alpha} = \frac{-SH_{w^S}SL_\alpha + SH_\alpha SL_{w^S}}{\Delta} > 0 \quad (\text{A.3})$$

$$\begin{aligned} \frac{dw^S}{d\alpha} &= \frac{-SH_\alpha SL_{wN} + SL_\alpha SH_{wN}}{\Delta} \\ &= \frac{A\delta\lambda}{\Delta t} [a_{HF}(w^S)a_{LS}(w^S) - a_{LF}(w^S)a_{HS}(w^S)] \left[\frac{A_\alpha}{t} \alpha \frac{\partial t}{\partial w^N} - A_{wN} + \frac{A}{t} \frac{\partial t}{\partial w^N} \right] >< 0 \end{aligned} \quad (A.4)$$

Note that $A_\alpha > 0$, $\partial t / \partial w^N > 0$ and $A_{wN} < 0$; thus, $\frac{dw^N}{d\alpha} > 0$ if and only if $\frac{a_{HF}(w^S)}{a_{LF}(w^S)} > \frac{a_{HS}(w^S)}{a_{LS}(w^S)}$.

2.2. Changes in f

Using Cramer's rule and (A.2) one can obtain:

$$\frac{dw^N}{df} = \frac{-SH_{wS}SL_f + SH_fSL_{wS}}{\Delta} > 0, \quad (A.5)$$

$$\begin{aligned} \frac{dw^N}{df} &= \frac{-SH_fSL_{wN} + SL_fSH_{wN}}{\Delta} \\ &= \frac{A\delta\alpha}{\Delta t^2} [a_{HF}(w^S)a_{LS}(w^S) - a_{LF}(w^S)a_{HS}(w^S)] \left[A_f \frac{\partial t}{\partial w^N} - A_{wN} \frac{\partial t}{\partial f} \right] >< 0 \end{aligned} \quad (A.6)$$

Note that the first bracketed expression is positive if and only if $\frac{a_{HF}(w^S)}{a_{LF}(w^S)} > \frac{a_{HS}(w^S)}{a_{LS}(w^S)}$. With $A_f > 0$, $\partial t / \partial w^N > 0$, $\partial t / \partial f < 0$ and $A_{wN} < 0$, the second bracketed expression is positive if and only if $A_f(\partial t / \partial w^N) > A_{wN} \partial t / \partial f$. Consequently, to obtain a necessary condition for the movement of w_S in terms of relative factor intensities as above, we need to make specific assumptions about the sign of the second bracketed expression. If we assume $A_f(\partial t / \partial w^N) > A_{wN} \partial t / \partial f$, then $\frac{dw^S}{df} > 0$ if and only if $\frac{a_{HF}(w^S)}{a_{LF}(w^S)} >$

$\frac{a_{HS}(w^S)}{a_{LS}(w^S)}$. On the other hand, if we assume $A_f(\partial t / \partial w^N) < A_{wN} \partial t / \partial f$, then $\frac{dw^S}{df} > 0$ if and only if $\frac{a_{HF}(w^S)}{a_{LF}(w^S)} >$

$< \frac{a_{HS}(w^S)}{a_{LS}(w^S)}$.

Appendix B:

(not for publication, to be made available on the author's web site and also upon request)

Simulation analysis

The relative wage effects of an increase in α are analytically clear as discussed in proposition 1. However, as stated in proposition 2, the relative wage effects of an increase in f remain analytically ambiguous. Moreover, the level and growth effects on wages, especially in the case of an increase in f , call for further investigation. To resolve these ambiguities and gauge the quantitative effects, we run numerical simulations of the theoretical model.¹

We borrow the benchmark parameters from previous econometric and calibration exercises. For several parameters, we calculate the Northern and Southern values as averages for developed and developing countries, respectively. We assume Cobb-Douglas production functions: $F_N(H_N, L_N) = A_N H_N^\beta L_N^{1-\beta}$ for Northern production, $F_F(H_F, L_F) = A_F H_F^\phi L_F^{1-\phi}$ for Outsourced production, $F_S(H_S, L_S) = A_S H_S^\sigma L_S^{1-\sigma}$ for Southern production. We further assume $A_N = A_F$ and $\beta = \phi$.² The values for the production parameters are set as: $\beta = \phi = 0.4$, $\sigma = 0.3$, $A_N = A_F = 1$, $A_S = 0.5$.³ In the benchmark analysis, the *skill intensity gap* between production outsourced to the South and local Southern production, defined as the difference between ϕ and σ is therefore equal to 0.1. The share of production shifted to the South, α , is set at 0.2. This makes the extent of outsourcing χ equal to 0.10, reflective of the measure of outsourcing used in the literature, i.e., the share of imported inputs in total intermediate input purchases. Using U.S. manufacturing data, Feenstra and Hanson (1999) calculate this share as 11.6 percent in 1990, while Campa and Goldberg (1997) calculate the same indicator as 8.2 percent in 1993. The remaining

¹ For simulations we used Mathematica version 4.1. All the software programs are available from the authors upon request.

² This is done to simplify the parameter search in the literature. The analytical and quantitative results are robust to assuming $A_N > A_F$ and $\beta > \phi$.

³ The wage bill share of skilled labor in Northern production β is set at 0.4. Machin and Van Reenen (1998), and Berman and Machin (2000) calculate this share—proxied by the share of non-production workers in the total wage bill—as ranging between 0.295 and 0.49 for developed countries. The wage bill share of skilled labor in the Southern production σ is set at 0.3. Pavcnik (2002) calculates this share for Chile as 0.35, while Berman and Machin (2000) calculate it as 0.33 for middle-income countries and 0.35 for low-income countries. The technology coefficients A_N , A_F and A_S are set such that the benchmark solution for relative wages in the North and the South are roughly consistent with the observed wage differentials. According to Berman and Machin (2000), in 1990 the relative wage in the North (low and middle income countries) was 1.6, while in the South (high income countries) it was close to 2.

parameters are: $\lambda = 1.3$, $n = 0.014$, $\rho = 0.07$, $N^S/N^N = 2$, $h^N = 0.25$, $h^S = 0.15$, $a_i = 0.8$, $k = 3$, $f = 0.4$, $\delta = 0.025$.⁴ With these parameter values, we obtain the benchmark solution shown in Table 1.

We increase α and f separately and generate changes in the extent of outsourcing χ and the rest of the endogenous variables. We then report the outsourcing elasticity for each endogenous variable. For wage variables (i.e., w^i , w_H^i and w_L^i for $i = N, S$) we calculate outsourcing elasticity as the percentage change in the wage variable divided by the absolute change in χ (i.e., in percentage points). For technology variables and the extent of outsourcing (i.e., f , t and χ), we calculate outsourcing elasticity as the absolute change in the relevant variable divided by the absolute change in χ . We repeat these calculations by allowing for variations in the skill intensity gap.

1. Effects of an increase in the share of production shifted to the South α

We increase α such that the extent of outsourcing χ increases by around 3-3.5 percentage points, an increase equivalent to the observed average change over each decade. Feenstra and Hanson (1999) find that the share of imported intermediate goods in total input purchases by the U.S. manufacturing industries increased from 6.5 percent in 1972, to 8.5 percent in 1979, and to 11.6 percent in 1990. In Table 1, under each level of skill intensity gap, the first column shows the solution for $\alpha = 0.2$. The second column presents the solution for $\alpha = 0.25$, all other parameters remaining unchanged. The third column reports the outsourcing elasticity values for the relevant wage variable.

We first focus on the benchmark case where the skill intensity gap is 0.1. In this case, when α is increased from 0.2 to 0.25, χ increases from 11.7 to 15.2 percent. The relative wages in both the North

⁴ The size of innovations, λ , measures the gross mark up (the ratio of the price to the marginal cost) enjoyed by innovators and is estimated as ranging between 1.05 and 1.4 [see Basu, 1996, and Norrbin, 1993]. The world population growth rate, n , is calculated as the annual rate of world population growth between 1991 and 2000 according to the World Development Indicators (World Bank, 2003). The subjective discount rate, ρ , is set at 0.07 to reflect a real interest rate of 7 percent, consistent with the average real return on the US stock market over the past century as calculated by Mehra and Prescott (1985). The ratio of Southern population to Northern population $\eta^S = N^S/N^N$ is set at 2, calculated as the ratio of the working age population in middle income countries to that in high income countries—as defined by the World Bank (World Development Indicators, 2003). The share of skilled labor in total population, h^i , is set at 15 percent for the South and 25 percent for the North. These figures, calculated by using the Barro and Lee (2000) data set, measure the percentage of the working age population that has completed secondary education in an average of developing and advanced countries, respectively, in 1995. The parameters a_i , k , f and δ are set such that the North's share of manufacturing in global manufacturing ($n_N + n_F - \chi$) exceeds the South's share ($n_S + \chi$), and the resulting aggregate rate of innovation, $I = m_S = 1.46$ percent, is consistent with empirical calculations. A value of $I = 1.46$ percent implies a growth rate of 0.4 percent as calculated by the rate of growth in consumer utility $g = I \log \lambda$. Recent empirical studies suggest that the rate of growth driven by knowledge advancements is in the neighborhood of 0.5 percent [see Denison, 1985 and Jones, 2002].

and the South respond positively to the higher χ . The outsourcing elasticity of the Northern skill premium is found to be 0.182. This implies that a 5 percentage points increase in χ as observed from 1972 to 1990 by the U.S. manufacturing industries (Feenstra and Hanson, 1999) raises the Northern relative wage by approximately 1 percent. The outsourcing elasticity of the Southern skill premium is found to be larger, 0.534. This implies that a 5 percentage point increase in χ raises the Southern relative wage by approximately 2.5 percent.

In the North, the higher skill premium is accompanied by higher wage levels for both skilled and unskilled labor. On the contrary, in the South, the increased skill premium comes at the expense of unskilled labor. The elasticity calculations imply that a 5 percentage point increase in χ pushes the Northern skilled and unskilled wages up by 4 percent and 3 percent, respectively. On the other hand, the Southern skilled wage increases by 1.9 percent, while the Southern unskilled wage decreases by 0.8 percent. Lastly, when α is increased from 0.20 to 0.25, the aggregate intensity of innovation I increases from 1.46 percent to 1.52 percent, raising the steady-state real wage growth rate g from 0.383 to 0.398 percent. This implies that a 5 percentage points increase in χ raises g by 0.021 percentage points.

The simulation results in Table 1 confirm the findings in Proposition 1. In addition, we can now quantify the responsiveness of skill premia to variations in the extent of outsourcing for different levels of skill intensity gap. We find that as the skill intensity gap increases, the outsourcing elasticity of Northern skill premium remains fairly stable whereas the outsourcing elasticity of Southern skill premium increases substantially. More specifically, for each incremental rise in the skill intensity gap by 0.1, the outsourcing elasticity of the Northern skill premium increases by only 0.012 on average while the outsourcing elasticity of the Southern skill premium increases by 0.52 on average.

We find that across all levels of skill intensity gap the wage levels of Southern skilled and unskilled labor move in opposite directions, while the skilled and unskilled wages in the North both increase as observed under the benchmark case. However, the magnitude of the elasticities change as the skill intensity gap varies. In the North, the outsourcing elasticity of both skilled and unskilled wages decrease as the skill intensity gap increases. On the other hand, in the South, the outsourcing elasticities of both skilled and unskilled wages increase in absolute terms when the skill intensity gap widens.

2. Effects of an increase in the probability of outsourcing success f

We report the quantitative effects of an increase in f in Table 2 in the same format as Table 1. We first note that under a wide range of reasonable parameters, the assumption stated in Proposition 2 $A_f(\partial u/\partial w^N) > A_{wN}\partial u/\partial f$ holds. Hence the relative wage effects of an increase in f are similar to those of an increase in α .

In the benchmark case, when f is increased from 0.4 to 0.8, χ increases from 11.7 percent to 12.1 percent. As in the case of an increase in α , the relative wages in both regions increase with the rise in χ . However, for an equal increase in χ , the quantitative impact of a higher f on the Northern skill premium is much larger than that of a higher α . A 5 percentage points increase in χ driven by a higher f raises the Northern skill premium by 7 percent, whereas the same increase in χ driven by a higher α raises the Northern skill premium only by 1 percent. On the other hand, the quantitative impact of a higher f on the Southern skill premium is roughly the same as that of a higher α . A 5 percentage points increase in χ driven by a higher f raises the Southern skill premium by 2.67 percent, which is close to the 2.5 percent value observed in the case of a higher α . When we compare the results under different levels of skill intensity gap, we observe that the outsourcing elasticity of Northern skill premium is much larger across all levels of skill intensity gap compared to the case of higher α . On the other hand, the outsourcing elasticities of Southern skill premium are quantitatively closer to those observed in the case of a higher α .

These results suggest that the source of the rise in outsourcing can be crucial in determining the extent of the variation in the *Northern* skill premium. Increased outsourcing exerts a much larger influence on the Northern relative wage when triggered by a rise in f than when it is triggered by a rise in α . Observe that in the former event, the initiating force is the increased outsourcing success rate by currently *non-outsourcing* industries, whereas in the latter event it is the increased outsourcing activity by currently *outsourcing* industries. This clear distinction in quantitative effects can be useful for further empirical research.⁵

In the benchmark case, the higher f raises the Northern wage levels for both skilled and unskilled labor, whereas in the South it raises the wage of skilled labor and reduces the wage of unskilled labor.

⁵ To see the intuition we hold the increase in χ constant and focus on the variation in n_N . Recall that when the increase in χ is driven by a higher α , the equilibrium level of n_N increases. Since production is unskilled labor intensive relative to R&D, this implies an increase in the relative demand for unskilled labor, *mitigating* the rise in the Northern skill premium. On the contrary, when the increase in χ is driven by a higher f , the numerical simulations point to a decrease in the equilibrium level of n_N (not shown in the tables). This implies a reduction in the relative demand for unskilled labor, *reinforcing* the rise in the Northern skill premium.

The elasticity calculations imply that a 5 percentage point increase in χ raises the Northern skilled and unskilled wages by 8.11 percent and 1.08 percent, respectively. On the other hand, the same increase in χ raises the Southern skilled wage by 1.77 percent, while reducing the Southern unskilled wage by 0.75 percent. Lastly, in response to the higher f the aggregate intensity of innovation I increases from 1.46 percent to 1.51 percent, raising the real wage growth rate g from 0.383 percent to 0.396 percent. This implies that a 5 percentage points increase in χ raises g by 0.16 percentage points. This is a much larger growth effect compared to the case of an increase in α . In addition, observe that across all levels of skill intensity gap, real wage growth responds positively to the increase in f .⁶

Table 2 shows that when the skill intensity gap increases, the outsourcing elasticity of Northern skill premium remains rather stable, while the outsourcing elasticity of Southern skill premium increases. In the North, the higher skill premium is accompanied by higher skilled and unskilled wage levels *only* when the skill intensity gap is below 0.15. When the skill intensity gap exceeds this threshold level the Northern skill premium increases at the expense of Northern unskilled labor. On the contrary, in the South, the higher skill premium always comes at the expense of the unskilled labor, independent of the level of skill intensity gap. Table 2 suggests that when the skill intensity gap increases, the patterns of outsourcing elasticities for skilled and unskilled wages are similar to those observed in the case of an increase in α .⁷

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⁶ We also endogenized f by assuming that a technology transfer stage, which requires the employment of both Southern and Northern skilled labor by Northern quality leaders, precedes the actual shifting of production to the South. Using numerical simulations (details available upon request) we found that in the North, as before, an increase in α raises the relative wage of skilled labor whereas in the South the threshold level of skill intensity gap above which the skill premium increases becomes negative (as opposed to being zero as before). The intuition is that when f is endogenous, Northern firms respond to the increased outsourcing opportunities by intensifying their efforts of technology transfer. This boosts the demand for both Southern and Northern skilled labor, putting additional upward pressure on the skill premia in both regions.

⁷ To check the robustness of the results, we reran the simulations using high and low values of the parameters—a standard method in the literature [see, for instance, Lundborg and Segerstrom (2002)]. More specifically we considered the following parameter values: $A_S/A_F = 0.5/0.65$ or $0.5/1.9$; $\lambda = 1.2$ or 1.4 ; $\rho = 0.04$ or 0.1 ; $\eta^S = 1$ or 5 ; $a_i = 0.6$ or 1.09 ; $f = 0.01$ or 4 ; $\delta = 0.0065$ and 0.04 . We found that the main qualitative and quantitative results are robust to alternative parameter choices.

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Table 1: The effects of an increase in a

(Benchmark parameter values are: $a_i = 0.8, k = 3, f = 0.4, d = 0.025, A_N = A_F = 1, A_S = 0.5, b = 0.4, f = 0.4, s = 0.3, N^N = 1, N^S = 2, h^N = 0.25, h^S = 0.15, r = 0.07, l = 1.3, a = 0.2, n = 0.014$)

Endogenous variables	No skill intensity gap $\beta = 0.3, f = 0.3, s = 0.3$			Low skill intensity gap $\beta = 0.35, f = 0.35, \sigma = 0.3$			Benchmark solution $\beta = 0.4, f = 0.4, s = 0.3$			High skill intensity gap $\beta = 0.55, f = 0.55, s = 0.3$		
	$a = 0.20$	$a = 0.25$	Elasticity	$a = 0.20$	$a = 0.25$	Elasticity	$a = 0.20$	$a = 0.25$	Elasticity	$a = 0.20$	$a = 0.25$	Elasticity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Relative wage in the South w^S	2.429	2.429	0.000	2.499	2.522	0.261	2.572	2.620	0.534	2.796	2.926	1.417
Relative wage in the North w^N	1.507	1.516	0.170	1.886	1.898	0.176	2.327	2.341	0.182	4.217	4.244	0.196
Northern skilled wage w_H^N	0.907	0.938	0.951	0.967	0.997	0.886	1.012	1.040	0.818	1.080	1.101	0.594
Northern unskilled wage w_L^N	0.602	0.619	0.776	0.513	0.525	0.705	0.435	0.444	0.632	0.256	0.260	0.396
Southern skilled wage w_H^S	0.505	0.505	0.000	0.515	0.519	0.182	0.526	0.533	0.373	0.557	0.576	0.985
Southern unskilled wage w_L^S	0.208	0.208	0.000	0.206	0.206	-0.078	0.204	0.203	-0.158	0.199	0.197	-0.413
Extent of outsourcing c	0.122	0.158	1.000	0.120	0.155	1.000	0.117	0.152	1.000	0.109	0.142	1.000
Intensity of innovation l	0.0153	0.0158	0.015	0.0150	0.0155	0.015	0.0146	0.0152	0.016	0.0136	0.0142	0.018

Table 2: The effects of an increase in f

(Benchmark parameter values are: $a_i = 0.8, k = 3, f = 0.4, d = 0.025, A_N = A_F = 1, A_S = 0.5, b = 0.4, f = 0.4, s = 0.3, N^N = 1, N^S = 2, h^N = 0.25, h^S = 0.15, r = 0.07, l = 1.3, a = 0.2, n = 0.014$)

Endogenous variables	No skill intensity gap $\beta = 0.3, f = 0.3, s = 0.3$			Low skill intensity gap $\beta = 0.35, f = 0.35, s = 0.3$			Benchmark solution $\beta = 0.4, f = 0.4, s = 0.3$			High skill intensity gap $\beta = 0.55, f = 0.55, s = 0.3$		
	$f = 0.4$	$f = 0.8$	Elasticity	$f = 0.4$	$f = 0.8$	Elasticity	$f = 0.4$	$f = 0.8$	Elasticity	$f = 0.4$	$f = 0.8$	Elasticity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Relative wage in the South w^S	2.429	2.429	0.000	2.499	2.501	0.248	2.572	2.577	0.506	2.796	2.809	1.322
Relative wage in the North w^N	1.507	1.515	1.415	1.886	1.897	1.409	2.327	2.340	1.404	4.217	4.238	1.388
Northern skilled wage w_H^N	0.907	0.916	2.371	0.967	0.975	1.991	1.012	1.018	1.623	1.080	1.083	0.570
Northern unskilled wage w_L^N	0.602	0.604	0.951	0.513	0.514	0.579	0.435	0.435	0.216	0.256	0.255	-0.813
Southern skilled wage w_H^S	0.505	0.505	0.000	0.515	0.516	0.174	0.526	0.527	0.354	0.557	0.559	0.924
Southern unskilled wage w_L^S	0.208	0.208	0.000	0.206	0.206	-0.074	0.204	0.204	-0.151	0.199	0.199	-0.395
Extent of outsourcing c	0.122	0.126	1.000	0.120	0.124	1.000	0.117	0.121	1.000	0.109	0.112	1.000
Intensity of innovation l	0.0153	0.0158	0.125	0.0150	0.0155	0.125	0.0146	0.0151	0.125	0.0136	0.0141	0.125