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Reparations for African-Americans as a Transfer Problem: A Cautionary Tale

*William A. Darity, Jr., Bidisha Lahiri, and Dania V. Frank**

Abstract

We examine how different methods of reparations payments to African-Americans affect both the black and nonblack populations of the United States using the framework of the transfer-problem from international trade theory as a theoretical foundation. We find that reparations payments that provide incentives for blacks to use the payment toward purchases of goods and services produced by nonblacks might expand the income gap. Also a reparations payment in the absence of productive capacity owned by blacks is found to have no final positive impact on black income. These results indicate that a reparations payment strategy must be carefully and cautiously conceived in order to achieve the desired effects.

1. Introduction

The question of whether African-Americans should receive reparations for having been subjected to slavery and nearly a century-long period of legally enforced segregation and discriminatory practices (the Jim Crow period) has been debated since General William T. Sherman's commitment to give freed slaves 40 acres and a mule following the US Civil War. Indeed, while some opponents of black reparations complain that there are no living victims of slavery, there are still large numbers of living victims of American apartheid which did not end formally until the mid-1960s Civil Rights Acts (Brophy, 2006). The late legal scholar Boris Bitker (1973) based his case for black reparations exclusively on the damages imposed on African-Americans during the Jim Crow period, ignoring the impact of slavery altogether as a justification for reparations. Nevertheless, enormous persistent disparities in wealth (or net worth) between black and nonblack Americans clearly find their origins in black enslavement and dispossession of accumulated assets during the Jim Crow era (Darity, 2008).

Although the case for black reparations can be made on grounds of principle, what has been lacking in the debate is a substantive discussion of the form and logistics for a program of reparations. Should each eligible African-American receive a check and a letter of apology from the government much like Japanese-Americans received for their internment during World War II? Should there be a trust fund from which eligible African-Americans could apply for business or homebuyer's grants? Or should every eligible African-American be guaranteed tuition paid in full for college?

Many different possible programs and payment schemes could be used to carry out a reparations payment to African-Americans. Our approach here assumes an income transfer from nonblacks to blacks, although there are other ways to carry out a reparations payment without a direct income transfer from one group to another. An

* Darity: Box 90245, Sanford School of Public Policy, Duke University, Durham, NC 27708-0245, USA. Tel: (919) 613-7336; Fax: (919) 681-8288; E-mail: william.darity@duke.edu. Lahiri: Spears School of Business, Oklahoma State University, Stillwater, OK 74078-4011, USA. E-mail: bidisha.lahiri@okstate.edu. Frank: Box 90315, Sanford School of Public Policy, Duke University, Durham, NC 27708-0243, USA.

example of an alternative would be a scheme where all taxpayers could be given the option of devoting some of their tax payments to a reparations fund. In this way, blacks potentially would be contributing to their own reparations program. Our objective in this paper is to examine how different methods of reparations payment affect both the black and nonblack population of the United States. We will undertake the investigation by using the transfer problem from international trade theory as a theoretical foundation.

This paper applies the theoretical basis of the transfer problem to the reparations debate in order to determine the effectiveness of several approaches to reparations. Section 2 presents a brief literature review. Section 3 uses Johnson's static framework to evaluate reparations plans that involve lump-sum payments from nonblacks to blacks by treating blacks and nonblacks as separate subnationalities within a country. Our analysis does not rely on the spatial separation of blacks and nonblacks. We assume only the existence of social recognition of group distinctions. Section 4 incorporates the supply-side aspects of Anne Krueger's model of discrimination to compare reparations payments policies that directly affect demand by ensuring a transfer payment versus the effects of reparations policies that affect production by the subnationalities through capacity-building policies. Section 5 presents concluding remarks.

2. Literature Review

The transfer problem poses the following question: Does a unilateral transfer from one country to another impose a secondary burden or blessing on the paying country through an adjustment in the terms of trade? Keynes (1929) and Ohlin (1929) explored this question after World War I, when debating whether Germany should have been forced to make reparations payment. Keynes took the *orthodox* view that the paying country would necessarily experience a secondary burden because the decline in the domestic demand for the paying country's goods (due to loss of income from the transfer) would be greater than the increased demand for the paying country's goods in the receiving country. Thus, Keynes opposed German reparations. Ohlin argued the more *neutral* view that there should be no presumptions whether there would be a secondary "blessing" or a secondary "burden."

Implicit in this debate is the issue of whether the receiving country experiences a secondary burden or blessing. If the paying country experiences an increase in their terms of trade or an increase in their balance of payments account due to the transfer, then the receiving country necessarily incurs a decline in their terms of trade or a decline in their balance of payments account. Indeed, it is possible that a transfer payment could result in a real income loss for the receiving country. Using a model in which the production functions are characterized by variable returns to scale, Choi and Yu (1987) found support for the *strong paradox*—the transfer payment results in improvement in the welfare of the transfer-paying country and immiserization of the transfer-receiving country.

Samuelson (1952, 1954) showed that when there are no trade impediments, the secondary effect of a transfer payment depends only on the magnitude of each country's marginal propensities to import out of income. Thus, Samuelson supported the neutral view, since there was no reason to assume, *a priori*, that one country's propensity is greater than the other.

Harry Johnson (1956) then asked whether the way in which a transfer is financed in the paying country and disposed of in the receiving country—either through taxing or spending or through borrowing and saving—affects the balance of payments for the

paying country. To address this question, Johnson set up a static fixed-price model and showed that the result once again hinges on marginal propensities to import and save.

In a later paper, Johnson (1957) offered a utility-based analysis of the transfer problem. He employed a Cobb–Douglas utility function to determine the maximum transfer amount that could be imposed to maintain a given utility level in the paying country. It is important to note that we are not performing a full welfare analysis of a reparations payment. Here we focus solely on changes in relative group incomes, not on welfare gains or losses. A utility-based analysis of the effects of various reparations schemes must await a future paper.

Roy Ruffin (1979) extended the transfer problem to a dynamic framework using a two-country extension of a one-sector Solow growth model. The model included free capital mobility with the transferring country also acting as the capital-exporting country. He found that, "if the savings rate of the capital exporting country is less (greater) than the savings rate of the capital-importing country, the paying country experiences a deterioration (improvement) in its terms of trade on the capital account" (Ruffin, 1979, p. 838).

Finally, we note that Anne Krueger (1963) constructed a trade-based model of discrimination with capital exports flowing from a nonblack sector to a black sector. She showed that income maximization by the nonblack community may cause them to exercise an export policy that results in differential returns to capital and a wage gap between blacks and nonblacks.

3. Reparation Schemes Affecting Demand

Many reparations plans posit a lump-sum transfer from nonblacks to blacks. It is interesting to note that the final effect of the transfer on the incomes of blacks and nonblacks will be different from simply the value of transfer. Moreover, there might be an additional secondary burden resulting from changes in the balance of payments for the nonblack group depending on how reparations are financed and distributed.

In the simplest scenario, the transfer payments would increase the demand for imports and reduce the supply of exports by the economy receiving the payment, while reducing the demand for imports and increasing the supply of exports by the economy providing the transfer. These excess supplies and demands consist of the secondary burden, which in the face of any supply schedules that are not completely elastic, would be manifest as an adverse terms-of-trade movement for the economy providing the transfer, T.

Consider two subnationalities: blacks b and nonblacks n. We first model the demand side of the framework. Any policies that affect demand will be effective when coupled with positively sloped or horizontal supply schedules.

Demand is modeled in a traditional Keynesian manner, where each group i $(i = b, n)$ divides its income between consumption on domestic goods C_i, consumption on imported commodities M_i, and saving S_i. The production and income of blacks and nonblacks is denoted by Y_b and Y_n, respectively. A narrow interpretation centers on a world where different commodities are produced by the two subnationalities. A broader macro interpretation would center on separate aggregate incomes of each of the two subnationalities where exports and imports might be in the same or different commodities. B_n is the balance of payments for nonblacks. If this is negative, nonblacks face an additional terms-of-trade burden; B_n also can be interpreted as the change in relative income. When B_n is negative it implies that the income net of transfer payment financing by the nonblacks declines relative to the income of blacks inclusive of transfer

payment receipts. Hence, a negative B_n is feasible even if the absolute incomes of both subnationalities rise:

$$Y_b = C_b + c_b \cdot Y_b + M_n + m_n Y_n, \tag{1}$$

$$Y_n = C_n + c_n \cdot Y_n + M_b + m_b Y_b, \tag{2}$$

$$B_n = M_b + m_b \cdot Y_b - M_n - m_n Y_n - T. \tag{3}$$

The c_i, m_i, and s_i coefficients are, respectively, the marginal propensities of the two subnationalities to consume, import, and save out of their income. Since these three exhaust the spending options, they sum to one. All coefficients are nonnegative.

$$s_i + c_i + m_i = 1, \quad s_i, c_i, m_i \geq 0. \tag{4}$$

Define the marginal propensities to consume, save, and import out of transfers as c_i', s_i', m_i', respectively.

$$s_i' + c_i' + m_i' = 1, \quad s_i', c_i', m_i' \geq 0.$$

Given that transfer income is similar to windfall income, it is reasonable to assume that the marginal propensities with respect to permanent income and windfall income will be different. Transfer policies also might be designed to attain specific propensities (s_i', c_i', m_i') associated with transfer incomes, as we will see below.

In the general case, let us consider a circumstance where transfer income has an effect on all three expenditure categories:

$$\begin{aligned} &\Delta C_b = c_b' T, \quad \Delta M_b = m_b' T, \\ &\Delta S_b = (1 - c_b' - m_b') T, \quad \Delta C_n = c_n' (-T), \\ &\Delta M_n = m_n' (-T), \quad \Delta S_n = (1 - c_n' - m_n')(-T). \end{aligned} \tag{5}$$

Making use of (5), equations (1), (2), and (3) can be rewritten as:

$$\Delta Y_b = c_b' T + c_b \cdot \Delta Y_b + m_n' (-T) + m_n \Delta Y_n, \tag{6}$$

$$\Delta Y_n = c_n' (-T) + c_n \cdot \Delta Y_n + m_b' T + m_b \Delta Y_b, \tag{7}$$

$$\Delta B_n = m_b' T + m_b \cdot \Delta Y_b - m_n' (-T) - m_n \Delta Y_n - T. \tag{8}$$

Equations (6), (7), and (8) can be solved for ΔY_b, ΔY_n, and ΔB_n in terms of the transfer income. They can be rewritten in the following multiplier forms:

$$\Delta B_n = \left[(m_b' + m_n' - 1) - \frac{m_n}{s_n} s_n' - \frac{m_b}{s_b} s_b' \right] \frac{s_n s_b}{\Omega} T, \tag{9}$$

$$\Delta Y_n = \left[(m_b' + m_n' - 1) + s_n' + \frac{m_b}{s_b} (s_n' - s_b') \right] \frac{s_b}{\Omega} T, \tag{10}$$

$$\Delta Y_b = \left[(1 - m_b' - m_n') - s_b' + \frac{m_n}{s_n} (s_n' - s_b') \right] \frac{s_n}{\Omega} T, \tag{11}$$

where $\Omega \equiv s_n s_b + s_n m_b + m_n s_b$.

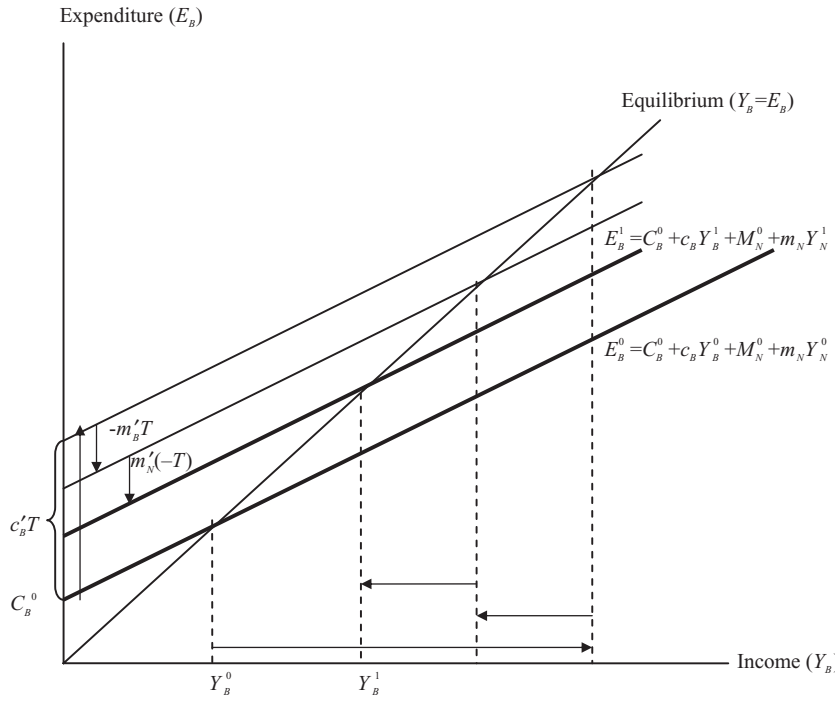

Figure 1. Income–Expenditure Keynesian Cross for the Black Subnationality

It can be seen from equations (10) and (11) that a positive transfer does not have an unambiguously positive effect on black income nor an unambiguously negative effect for the nonblack income. This can be clarified by noting the export–imports interaction of these two subnationalities, as shown in Figure 1. There is nothing in the model that prevents Y_B^1 from being smaller than Y_B^0. We explore the various possibilities below.

For there not to be any secondary burden on the nonblacks, the term with square brackets in equation (9) has to equal zero. In the special case where $s_i' = s_i$ and $m_i' = m_i$ for $i = b, n$, the secondary burden on the balance of payments simply equals the value of the transfer payment.

We next consider various possible reparations schemes and analyze the change-in-income effect and the secondary burden associated with each scheme. The first reparations scheme that we will consider is one where nonblacks finance the reparations solely out of income; i.e. they do not engage in borrowing—and blacks dispose of the transfer solely through spending. Reparations programs that prevent blacks from putting part of the reparations payment into savings include voucher programs where the payment is allotted for specific purposes like school tuition or home purchases. A second reparations scheme to be considered is one where nonblacks only can finance the reparations payment by borrowing, and blacks only can dispose of the transfer by saving. It could be that reparations payments to blacks are designated specifically for a trust fund, a 401k, or other retirement saving plans. As a third example, we will consider the case of "tied aid" that considers the consequences of a reparations payment in which nonblacks restrict blacks to using the payment to purchase goods produced by nonblacks.

According to a September 2001 report released by the US Census Bureau, there were approximately 823,500 black-owned businesses in 1997. These businesses made up

only 4% of the 20.8 million nonfarm businesses in the US and generated a mere 0.4% of the $18.6 trillion in receipts for all nonfarm businesses in the US. Since not all of the receipts to black businesses were from goods and services sold to nonblacks, it is safe to say that the receipts from services sold to nonblacks is less than 0.4% of total US business receipts. Considering these figures, it is not a far stretch to consider an economy where blacks do not engage in any production of goods and services. This is the fourth scenario considered in our analysis.

Scenario 1

Nonblacks finance reparations solely out of current spending without engaging in borrowing. Blacks dispose of the transfer (the reparations payment) exclusively through spending either on domestic or imported goods, $s_b' = 0$, $s_n' = 0$:

$$\Delta B_n = [(m_b' + m_n' - 1)]\frac{s_n s_b}{\Omega} T,$$

$$\Delta Y_n = [(m_b' + m_n' - 1)]\frac{s_b}{\Omega} T,$$

$$\Delta Y_b = [(1 - m_b' - m_n')]\frac{s_n}{\Omega} T.$$

If the sum of the two marginal propensities to import out of transfers equals unity, then there is neither a secondary burden nor any primary effects; i.e. the transfer does not affect black or nonblack incomes at all. If the sum is less than unity, then the income of nonblacks goes down, the income of blacks goes up, and there is also a secondary burden on nonblacks. The first part of the criterion will be large if both blacks and nonblacks apply a greater fraction of the reparations payment to changes in import demand than to changes in domestic demand. If blacks increase their demand for imports of nonblack goods more than they increase their demand for their own consumption good, and if nonblacks decrease their demand for imports of black goods more than they decrease their demand for their own consumption good, the net result will be an increase in the demand for nonblack goods and a decrease in the demand for black goods. Thus, the income of blacks would decrease and the income of nonblacks would increase. There would be a secondary blessing for nonblacks and a secondary burden on blacks due to the reparations payment.

Scenario 2

In another case, assume nonblacks only can finance the reparations payment by borrowing, and blacks only can dispose of it by saving. In this case, both m_b' and m_n' are zero. Since the entire amount of the reparations goes to reduce savings for the nonblacks, s_n' equals unity and by similar reasoning s_b' equals unity:

$$\Delta Y_n = 0, \quad \Delta Y_b = 0, \quad \Delta B_n = \left[-1 - \frac{m_n}{s_n} - \frac{m_b}{s_b}\right]\frac{s_n s_b}{\Omega} T = -T.$$

As reparations payments are financed from and invested in savings, there is no effect on current demand. The effect on balance of payments simply negates the transfer payment. The reparations payment necessarily imposes a secondary burden on non-

blacks equal to the direct secondary burden of the transfer payment. This secondary burden does not get altered by any multiplier effects because there are no changes in current consumption or imports caused by this type of reparations policy.

Scenario 3: Tied Aid

As the third example, consider the case of "tied aid." Imagine a reparations payment in which nonblacks restrict blacks to using the payment to purchase goods produced by nonblacks. In this case m_b' would be equal to unity, making s_b' and c_b' both equal to zero. The income equations become:

$$\Delta B_n = \left[m_n' - \frac{m_n}{s_n} s_n' \right] \frac{s_n s_b}{\Omega} T,$$

$$\Delta Y_n = \left[m_n' + s_n' + \frac{m_b}{s_b} s_n' \right] \frac{s_b}{\Omega} T > 0,$$

$$\Delta Y_b = \left[-m_n' + \frac{m_n}{s_n} s_n' \right] \frac{s_n}{\Omega} T.$$

The income change for nonblacks is always positive in this case. They receive the entire payment back through their export demand. The result for blacks depends on how much of the payment nonblacks financed by borrowing. The amount of the reparations payment financed by nonblacks through a reduction in import demand has to be less than m_n/s_n times the amount financed by borrowing in order to result in increased black income. The intuition behind this condition is that if the import demand of nonblacks for black commodities is not reduced by a large amount, blacks would experience an increase in their income level. This condition also will imply a secondary burden on nonblacks. Violation of this criterion implies both a reduction of black income and a secondary blessing to nonblacks resulting due to the reparation scheme.

Scenario 4: Reparations with No Black Production

When there is no production by blacks, it implies that nonblacks cannot import black goods, making m_n' equal zero. In addition, blacks have to use the transfer payments only on imports of nonblack commodities or on savings which makes the sum of m_b' and s_b' equal to unity. Then the change in income and secondary burden equations take the following form:

$$\Delta Y_n = \left[(s_n' - s_b') \left(\frac{m_b}{s_b} + 1 \right) \right] \frac{s_b}{\Omega} T,$$

$$\Delta Y_b = \left[\frac{m_n}{s_n} (s_n' - s_b') \right] \frac{s_n}{\Omega} T,$$

$$\Delta B_n = \left[-s_b' \left(1 + \frac{m_b}{s_b} \right) - \frac{m_n}{s_n} s_n' \right] \frac{s_n s_b}{\Omega} T.$$

In terms of change in income, the incomes of both subnationalities will rise under the criterion s_n' being greater than s_b'. Change in incomes for blacks and nonblacks have no

conflict of interest in terms of parameters. This happens because large s_b' means a small multiplier effect for black income and also a small increase in import demand for nonblack goods and hence nonblack income. A large value of s_n', on the other hand, means a small magnitude of the negative impact of the transfer financing on nonblack income which in turn also implies a small negative impact on the import demand of black produced commodities and hence on black income. Under this scenario, the nonblacks unambiguously face a balance of payments secondary burden. This implies that even though the black consumption out of the transfer receipts is only on imported nonblack commodities, the increase in nonblack income will not be sufficient to offset the negative effect of the initial transfer value on balance of payments.

The parameter restrictions in this scenario have required m_n' being equal to zero but have not imposed a specific value for m_n. If blacks truly have no productive capacity in place, then they would not be able to meet import demand either before or after the transfer, requiring m_n to be zero as well. The sum of m_b and s_b also equal unity because, in the absence of domestic production, c_b equals zero. In this case, the change in black income due to a transfer payment equals zero because all transfer payments are remitted back to nonblack income in the form of import demand by blacks for nonblack commodities, resulting in no final impact on demand and production of black commodities.

4. Supply-Side Analysis

If the marginal propensities relate to nominal income instead of real income, then all the demand-side results that we have derived so far apply to nominal income. This might be more relevant for our model with exports and imports. For example, if the domestic price level changes, it is unrealistic to assume that the real import demand for domestic commodities would remain unchanged.

Johnson (1956) assumed that everybody faces the same international prices. We assume that the prices of nonblack-produced commodities may differ from black-produced commodities. Both subnationalities have distinct preferences about consumption of domestic and imported goods captured by the parameters c_i and m_i, respectively. Given that the preferences over goods from these two sources are not treated as substitutes, there is no reason to restrict the prices of the commodities produced by the two subnationalities to be equal.

For any given transfer policy, demand-side analyses lead to specific values of nominal aggregate demand (AD), which can be represented as rectangular hyperbola in (the price, real-output) plane of each subnationality.

When considered in conjunction with perfectly elastic supply functions for both nationalities, the distinction between real and nominal income becomes irrelevant. However, when we consider a more realistic situation of upward-sloping supply functions, we need to consider the full system of two demand functions and two supply functions in order to determine the equilibrium real incomes and price levels for the two subnationalities.

To grasp the relation between the secondary burden effect and the terms-of-trade effect, note that there is no reason for the transfer policy to cause changes in aggregate expenditure of a value equal to the value of transfer. After all, the funds might come out of dissaving and might go into saving. The situation where transfer funds entirely come out of dissaving and go entirely into saving implies s_i' equals unity for $i = B, N$. In this scenario the change in balance of payments B_n for nonblacks still negates the transfer but there is no effect on aggregate income (refer to Figure 2). A negative balance of

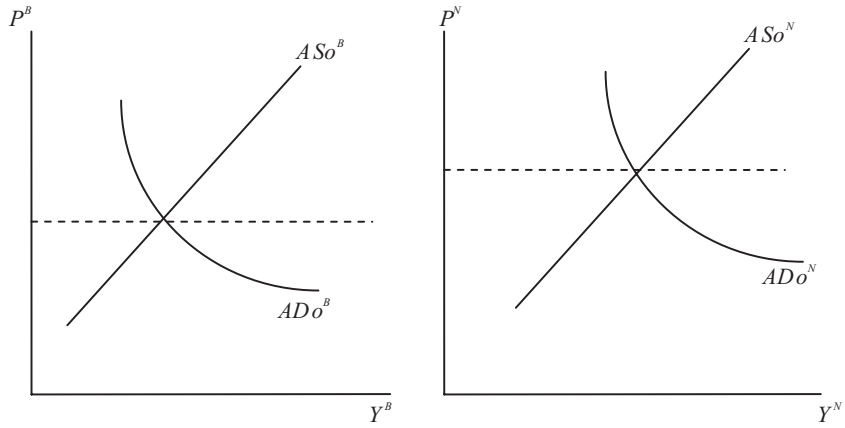

Figure 2. Transfer Policy when $s'_B = 1$ and $s'_N = 1$ Changes Balance of Payments for Nonblacks by −T but Does Not Affect AD and Terms of Trade for the Subnationalities

payments translates into a deteriorating terms-of-trade effect only when change in B_n is less than the negative of the transfer payment value. The terms-of-trade for the donor nonblack subnationality are unaffected or favorably affected when ΔB_n respectively equals or is greater than the negative of the transfer payment value.

To study the effects of supply-side policies, let us assume a Krueger-like set-up where production in each subnation uses skilled labor[1] S_i and unskilled labor L_i and owns a fixed capital stock. Let us assume that nonblacks have an endowment advantage in skilled labor, and they export it to black production sector.[2] Real income for the nonblack subnationality is the sum of the value of domestic production and the earnings on domestic skilled labor E exported to and employed in the black sector. Real income for the black subnationality is the value of domestic production net of the payments to nonblack skilled labor employed in the black sector.

$$Y_n = f(S_n - E, L_n) + \frac{p_b}{p_n} f_{SB} E,$$
$$Y_B = f(S_B + E, L_B) - f_{SB} E.$$

Nonblacks are assumed to choose their skilled labor exports to maximize their real income given the prevailing economic conditions. Skilled labor is assumed to be fully employed in both subnationalities. However, there is unemployment in the unskilled labor market and the nominal wages of unskilled labor are fixed in the relevant run. The demand and employment of unskilled labor is derived from real income maximization once the decisions regarding skilled labor allocations have been made (see Figure 3).

The first-order condition for skilled labor exports by nonblacks to maximize real income of the nonblacks is given below. The marginal product of skilled labor in the nonblack sector would be lower than the marginal product of skilled labor in the black sector for maximization of nonblack income:

$$f_{SN} = \frac{p_b}{p_n}(f_{SB} + f_{SSB} E).^3$$

Nominal wages for unskilled workers are assumed to be fixed and lead to a positively sloped supply function for both subnationalities.[4]

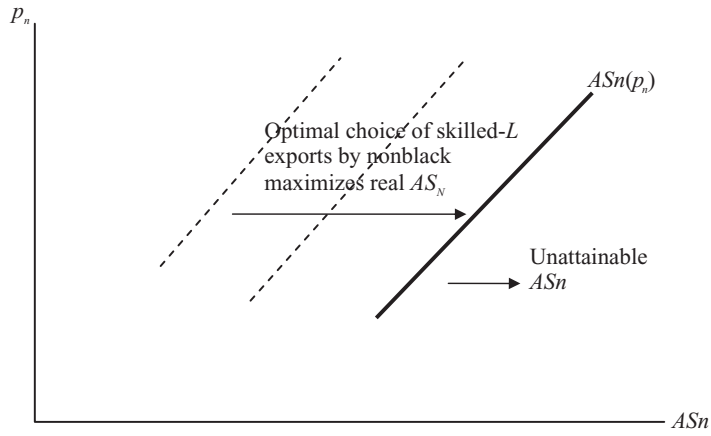

Figure 3. Allocation of Skilled Labor by Nonblacks

Consider a supply-side policy—for example, improvement in schooling/training—that increases the skilled labor endowment of blacks. Simultaneously, this policy is financed by reducing funds for schooling/training of nonblacks, reducing their endowment of skilled labor. What would be the impact of this policy on the respective supply functions?

To analyze these effects, let us evaluate the shift of the aggregate supply (AS) curve for a given price level. A constant price level also means a fixed real wage for unskilled labor.

If skilled labor were allocated in a perfectly competitive manner across sectors with equalization of values of marginal products across sectors, this education policy would not affect the aggregate real income of the economy. Change in skilled labor exports would offset the change in education effects. However, when nonblacks choose skilled labor exports in an optimizing manner, causing the value of the marginal product of labor in the nonblack sector to be lower than in the black sector, the above policy would result in a higher aggregate income.

In the standard[5] case, the following results arise.[6] An increase in the skilled labor endowment of nonblacks raises their optimal skilled labor exports. An increase in the skilled labor endowment of blacks lowers the optimum quantity of skilled labor exports by nonblacks:

$$0 < \frac{dE}{dS_N} < 1,$$

$$-1 < \frac{dE}{dS_B} < 0.$$

Change in education shifts the AS supply curves. The nonblack AS function shifts left while the black supply function shifts out. Nonblack income goes down because nonblacks are able to exercise "optimal discrimination" only on the smaller volume of skilled labor exports. Black income goes up because instead of being dependent on skilled labor imports which came at a discriminatory rate, the black skilled labor endowment has gone up, of which they can make optimal use. Aggregate income of the overall economy goes up because skilled labor gets reallocated to the sector where its

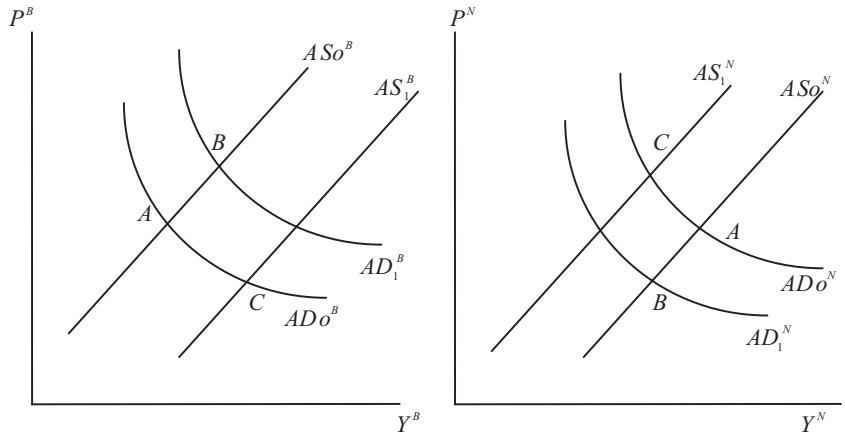

Figure 4. Effect of Policies on Terms of Trade

marginal product is higher. So the educational policy leads to a Pareto-superior outcome, which can make both parties better off under a suitable transfer payment from blacks to nonblacks (!) to compensate for the losses suffered by the change in educational policy.

With a supply-side reparations scheme that affects skilled labor endowments, there is no direct transfer that affects the demand. The respective shifts in the supply function imply that blacks face an increase in income and the nonblacks face a decrease in income even in the face of skilled-labor mobility across subnationalities.[7] This happens because changes in endowments represent a method of circumventing the discriminatory export policies practiced by nonblacks in order to maximize the income of the nonblack subnationality. Additionally, what is different in the supply-side policies is that blacks face a secondary burden in the form of deteriorating terms of trade as can be seen in Figure 4 ($A \rightarrow C$) while in the direct transfer reparations policies that affect demand, the secondary burden is, in most scenarios, borne by the nonblacks ($A \rightarrow B$).

5. Conclusion

The general-equilibrium model we advance offers new insights about the debate over reparations for African-Americans. First, we add to the discussion the idea that a reparations payment might enrich the donors. This sheds new light on arguments against reparations that claim that reparations payments would be too much of a burden for the payer to bear. It also provides a perverse incentive to the payer—other than altruism and atonement—to pay reparations.

Second, and perhaps more important, this model provides a cautionary note towards the design of a reparations plan. If one believes that one important purpose of reparations is to bridge the income and/or wealth gap between blacks and nonblacks, then the way in which reparations are financed and carried out, as well as the economic conditions at the time of the payment, greatly affect success in achieving the goal. We have shown that if blacks do not have productive capacity in place prior to the reparations payment, there will be no ultimate effect on black income. We also have shown that reparations payment that either mandate or provide incentives for blacks to use the payment towards goods and services produced by nonblacks will increase the

income of nonblacks while possibly decreasing the income of blacks. Both of these results run counter to the goal of closing the racial income gap.

Black income will rise under a reparations program designed to induce blacks to spend largely on black commodities, while inducing nonblacks to finance the reparations payment primarily by reducing consumption of nonblack commodities. A reparations policy designed to improve the productive capacity of blacks also would increase the relative income of blacks but would impose a secondary burden or adverse terms-of-trade effect on blacks. Unless the latter effect is unusually large the net consequence of this type of program would be to close the gap. Thus, our paper uncovers some of the complexities of the effects of a reparations program and underscores the importance of carefully considering the form reparations should take in order to achieve a narrowing of racial income or wealth disparities in America.

Appendix

Analysis of the change in skilled labor endowments in the two subnationalities and the effect on exports of skilled labor.

FOC of skilled-labor exports:

$$f_{Kn}(K_n - E, L_n) = \frac{p_b}{p_n}[f_{Kb}(K_b + E, L_B) + f_{KKb}(K_b + E, L_B)\cdot E].$$

Total derivative:

$$f_{KKn}(dK_n - dE) + f_{KLn}dL_n$$
$$= \frac{p_b}{p_n}[f_{KKb}(dK_b + dE) + f_{KLB}dL_B + f_{KKKb}(dK_b + dE)\cdot E + f_{KKLb}dL_B \cdot E + f_{KKb}dE].$$

We wish to derive the effect of an increase in skilled-labor endowment on the volume of exports of skilled labor across subnationalities. Putting $dL_b = 0$, $dL_N = 0$*.

When $dK_b = 0$:

$$f_{KKn}(dK_n - dE) = \frac{p_b}{p_n}[2f_{KKb} + f_{KKKb}E]dE,$$

$$f_{KKn}dK_n = \frac{p_b}{p_n}[(2f_{KKb} + f_{KKKb}E) + f_{KKn}]dE,$$

$$\frac{dE}{dK_n} = \frac{f_{KKn}}{f_{KKn} + \frac{p_b}{p_n}(2f_{KKb} + f_{KKKb}E)},$$

$$0 < \frac{dE}{dK_n} < 1;$$

i.e. an increase in nonblack skilled labor endowment increases the exports of skilled labor, but by less than the increase in the endowment.

When $dK_n = 0$:

$$\frac{p_b}{p_n}[f_{KKb}(dK_b + dE) + f_{KKKb}(dK_b + dE)\cdot E + f_{KKb}dE] + f_{KKn}(dE) = 0,$$

$$\frac{p_b}{p_n}(f_{KKb} + f_{KKKb} \cdot E)\,dK_b = (-1)(f_{KKn} + 2f_{KKb} + f_{KKKb}E)\,dE,$$

$$\frac{\frac{p_b}{p_n}(f_{KKb} + f_{KKKb} \cdot E)}{(f_{KKn} + 2f_{KKb} + f_{KKKb}E)} = (-1)\frac{dE}{dK_b},$$

$$-1 < \frac{dE}{dK_b} < 0;$$

i.e. an increase in black endowment of skilled labor decreases the exports of nonblack skilled labor, but by less than the increase in the endowment.

When a unit of educational infrastructure removed from nonblacks to the blacks produces an identical change in skilled labor in both subnations, $dK_b = dK = -dK_n$:

$$f_{KKn}((-dK) - dE) = \frac{p_b}{p_n}[f_{KKb}(dK + dE) + f_{KKKb}(dK + dE) \cdot E + f_{KKb}dE],$$

$$\left[f_{KKn} + \frac{p_b}{p_n}(f_{KKb} + f_{KKKb}E)\right](dK + dE) + \frac{p_b}{p_n}f_{KKb}dE = 0,$$

$$\frac{dE}{dK} = (-1)\frac{\left[f_{KKn} + \frac{p_b}{p_n}(f_{KKb} + f_{KKKb}E)\right]}{\left(\left[f_{KKn} + \frac{p_b}{p_n}(f_{KKb} + f_{KKKb}E)\right] + \frac{p_b}{p_n}f_{KKb}\right)},$$

$$-1 < \frac{dE}{dK} < 0.$$

The change in unskilled labor demand as a function of change in skilled labor endowment:

$$f_L(K - E, L) = \frac{w}{p},$$

or

$$f_{LL}(K - E, L)\,dL + f_{KL}(K - E, L)\,dK = 0,$$

or

$$dL = \frac{-f_{KL}(\cdot)}{f_{LL}(\cdot)}dK > 0.$$

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Notes

1. In the Krueger analysis, the two inputs are capital and labor which is mathematically identical to our interpretation of skilled and unskilled labor with fixed capital stock as the factors of production.
2. In this static model, endowments are given. The assumption that blacks are endowed with less skilled labor relative to nonblacks is made on historical grounds.
3. The associated second-order condition for maximization is

$$\frac{p_b}{p_n}[2f_{SSB} + f_{SSSB}E] + f_{SSN} < 0.$$

4. Increase in prices reduces the real wages, increasing the demand for unskilled workers and hence leading to a positively sloped supply function.
5. Conditions under which this result is not valid are shown in the Appendix but may be considered as aberrations that do not make much intuitive sense.
6. Derivations are shown in the Appendix.
7. It can be shown that the aggregate income of the nation, defined as the sum of the incomes of the two subnationalities, goes up.