THE PROMISES AND PITFALLS OF CONTEMPORANEOUS RESERVE REQUIREMENTS FOR THE IMPLEMENTATION OF MONETARY POLICY

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1. Introduction

In October 1979, the Fed acknowledged the potential value of reserve targeting for controlling the money stock and stabilizing the price level. It soon became apparent that the benefits of reserve targeting could not be realized with the lagged reserve requirement rules then in place. Consequently, in June 1982 the Federal Reserve Board decided to move to contemporaneous reserve requirements (CRR). Announcing its intention to change to CRR, the Board said simply that it expected CRR "to improve the implementation of monetary policy to a degree by strengthening the linkage between reserves held by depository institutions and the money supply."[1] This is essentially all the Board has said about the value of CRR for making policy. The benefits of CRR can be more elusive than this statement suggests and more significant as well. This article is intended to point out the promises and pitfalls of CRR for the implementation of monetary policy.

2. The CRR Rules[2]

The new CRR rules have been in place since February 1984. Under CRR, reserve requirements are computed on the basis of 14-day computation periods that end every other Monday. Reserve requirements must be met on a daily average basis over a 14-day maintenance period ending every other Wednesday. For a particular maintenance period, reserve requirements on transaction deposits are computed on the basis of the 14-day computation period ending on the Monday two days prior to the end of that maintenance period.[3,4] Required reserves on nontransaction deposits, e.g., certain time deposits and Eurocurrency liabilities, are based on average deposits for the 14-day computation period ending on the Monday 17 days before the beginning of the maintenance period. In addition, vault cash eligible to be counted as reserves is based on vault cash during the 14-day computation period ending 17 days before the beginning of the maintenance period.

Figure 1 illustrates the contemporaneous reserve requirement rules in place since February 1984 and the lagged reserve requirement rules in place from September 1968 through January 1984. As the diagram indicates, the new reserve requirement rules are not strictly contemporaneous. Even the maintenance period for transaction deposits lags the computation period by two days. However, because the new set of reserve requirement rules are generally known as contemporaneous reserve requirements and

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1 See Dow Jones Newswire [June 1982] and Board of Governors of the Federal Reserve System [January 1984b].

2 See Board of Governors of the Federal Reserve System [October 1982].

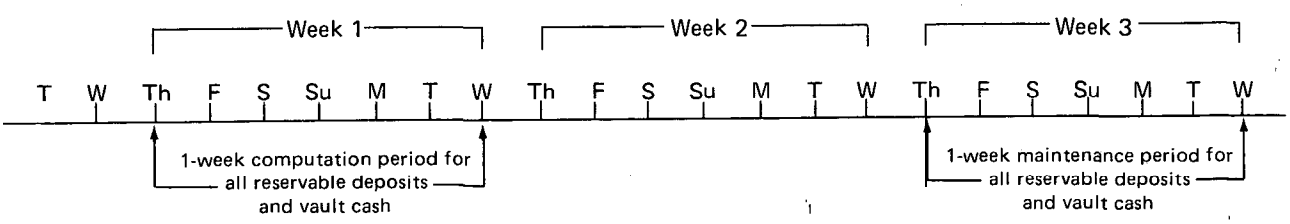
3 Under CRR, reservable transaction balances include (1) demand deposits at all commercial banks (including those due to banks, other depository institutions, and the U.S. government); (2) other checkable deposits (OCD) consisting of negotiable order of withdrawal (NOW) accounts, automatic transfer service (ATS) accounts, telephone and preauthorized transfer accounts, credit union share draft accounts, and demand deposits at thrift institutions; (3) less deductions for demand balances due from depository institutions in the United States and cash items in the process of collection. In general, CRR applies only to depository institutions that file the weekly FR 2900 report of deposits.

4 Reserve requirements under the Monetary Control Act (MCA) of 1980 are designed to control aggregate transaction deposits. After a gradual phase-in period, under the MCA depository institutions are required to maintain a reserve equal to 12 percent of transaction deposits in excess of a minimum (roughly 2.5 million dollars). In the MCA framework, a 3 percent reserve is also required against nonpersonal time deposits.

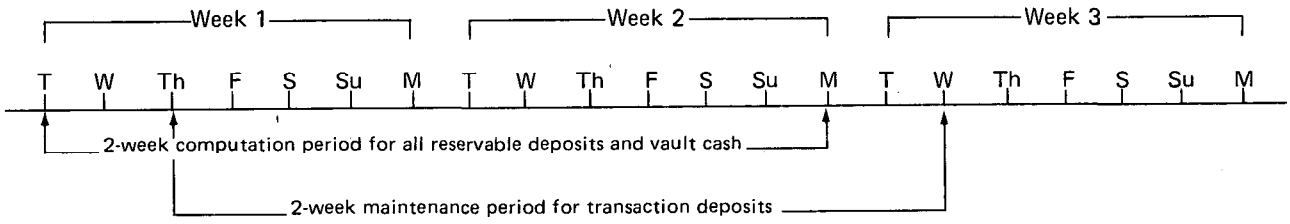
Figure 1

AN ILLUSTRATION OF THE LAGGED AND CONTEMPORANEOUS RESERVE REQUIREMENT RULES FOR TRANSACTION DEPOSITS

Lagged Reserve Requirements
(September 1968 – January 1984)



Contemporaneous Reserve Requirements*
(since February 1984)



*The 2-week maintenance period for nontransaction deposits and vault cash begins on the Thursday of week 5.

because this article is concerned with reserve requirements on transaction deposits, which are approximately contemporaneous, the new set of rules is referred to as contemporaneous reserve requirements throughout this article.

3. The Problem with Lagged Reserve Requirements, and the Potential Benefit of CRR for Monetary Control

Prior to October 1979, the Fed had been explicitly using the Federal funds rate as its policy instrument.[5] That is, the Fed had been setting the Federal funds rate on a week by week basis to achieve its objectives. But at that time, the Fed decided to move to "reserve targeting," that is, to use bank reserves as its policy instrument to control the money stock and stabilize the price level.

Subsequently, it became apparent' that reserve targeting could not be adequately implemented with lagged reserve requirements. To see why, suppose the Fed were to attempt strict control of total reserves under lagged reserve requirements. When required reserves differed from targeted total reserves, the funds rate would begin to adjust to clear the reserve market. But under lagged reserve requirements changes in current deposits would not affect current required reserves, so the banking system could not adjust required reserves in response to these interest rate movements. If the Fed were to adhere to a targeted volume of total reserves that was inconsistent with required reserves, funds rate movements could not efficiently clear the reserve market. Under lagged reserve requirements, excessive and essentially

[5] McCallum [November 1981] describes the use of an interest rate policy instrument in a rational expectations model.

pointless funds rate volatility would likely be associated with strict total reserve control.[6]

In practice, the Fed provided a mechanism for reserve market clearing with lagged reserve requirements by allowing the volume of discount window borrowing to adjust to funds rate movements. As a result of this discount window policy, the Fed retained direct control of only the nonborrowed portion of total reserves. When nonborrowed reserves supplied by the Fed were less than required reserves, banks were allowed to borrow the difference from the discount window. In this setup, total reserves did not determine deposits. The Fed merely accommodated the demand for reserves required to support deposits on the books of banks two weeks earlier. The only way the Fed could control deposits was by managing borrowed reserves to manipulate the funds rate in order to influence other interest rates and the quantity of money demanded.

The nonborrowed reserve-lagged reserve requirements operating procedure was even inferior to the pre-October 1979 procedure in one important respect. The principal change involved in moving to nonborrowed reserve targeting was that the Fed affected the funds rate indirectly through the volume of borrowing it "forced" banks to do at the discount window rather than directly as it had before October 1979.[7] Discount window administration imposes a nonpecuniary cost of borrowing that rises with volume and the duration of borrowing. The more banks are "forced" to borrow at the window the higher they bid up the alternative cost of reserves in the Federal funds market, i.e., the Federal funds rate, relative to the discount rate. The Fed varied the "forced" volume of discount window borrowing by appropriately choosing nonborrowed reserve supply. This is how the Fed influenced the funds rate and ultimately the money stock. However, the relationship between a given volume of "forced" discount window borrowing and the spread between the funds rate and the discount rate is volatile and difficult for the Fed to predict.[8] In turn, the instability of the relation between borrowing and the spread made the short-term relationship between nonborrowed reserves and the funds rate difficult to predict. In short, with the post-October 1979 nonborrowed reserve-lagged reserve requirements operating procedure it was more difficult for the Fed to control both the funds rate and the money stock.

The major benefit of moving to CRR is that the change could make it easier for the Fed to control total reserves. With CRR, contemporaneous funds rate movements could influence the demand for reservable deposits and required reserves, and more effectively bring total reserve demand into equilibrium with total reserve supply. Under CRR, the Fed would no longer have to make discount window borrowing opportunities available to banks to help the reserve market clear. The Fed could simply close the discount window to routine adjustment borrowing and target a constant volume of total reserves, that is, the Fed could strictly control the volume of total reserves available to support deposits of the banking system.[9,10] Essentially, CRR makes total reserve control easier by allowing the Fed to shift the burden of reserve market adjustment from itself to the banking system.

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[6] McCallum and Hoehn [February 1983] and Poole [November 1982] discuss the inefficiency of total reserve targeting under lagged reserve requirements.

[7] For more discussion of this point, see Goodfriend and Hargraves [March/April 1983], pp. 10-11, and Poole [November 1982, Part II], pp. 586-7.

[8] Goodfriend [September 1983] explains theoretically why this is the case.

[9] In a growing economy, strict total reserve control could lead to a steady deflation. To avoid such an outcome, total reserves could be strictly targeted at a predetermined rate of growth to achieve price level stability or moderate inflation.

[10] Strict control of the monetary base (bank reserves plus currency in the hands of the public) would yield roughly the same benefits as those attributed to strict total reserve targeting in this article. The difference between these policies is that under total reserve targeting the Fed supplies sufficient monetary base to provide the volume of targeted total reserves plus enough additional base to accommodate forecasted currency demand. Any unexpected movements of currency into or out of the banking system are offset on a regular basis by appropriate open market operations. By contrast, under monetary base targeting the Fed simply supplies a targeted volume of base. Total reserve targeting has the advantage that it would not allow a shift in the demand for currency relative to reservable deposits to cause a contraction or expansion of deposits. But monetary base targeting has the advantage that in times of reserve need the banking system could attract currency to help satisfy the need and in times of reserve abundance the public could absorb unwanted reserves as currency, thereby somewhat cushioning short-term interest rates. Normally, the demand for currency is well-behaved so that in practice the distinction between total reserve and base targeting is relatively minor.

Note that the total reserve target could be defined either net or gross of reserves not supporting transaction deposits of the nonbank public, e.g., interbank deposit, U. S. government deposits, and time deposits. The relevant issues in this case are analogous to those discussed above with respect to total reserve versus monetary base targeting.

Fama [January 1980] contains a useful theoretical discussion of both total reserve control and monetary base control.

4. The Value of Strict Total Reserve Control

The major benefit of strict total reserve control is that it can enable the Fed to manage the money stock without concern for either the funds rate or the demand for borrowed reserves. Banks have an incentive to economize on non-interest-earning excess reserves, i.e., reserves held above legal requirements, at all but very low interest rates. By strictly controlling total reserves, the Fed can exercise control of aggregate deposits by exploiting the banking system's incentive to economize on excess reserves, Formally, if D ≡ aggregate reservable deposits, rr ≡ the required reserve ratio, er ≡ excess reserve ratio, and TR ≡ aggregate total reserves, then $D = \left[\frac{1}{er + rr}\right] TR$. The ratio $\frac{1}{er + rr}$ is called the total reserve money multip1ier.[11] The banking system's well-defined demand for excess reserves translates into a well-defined and reasonably stable money multiplier. Under CRR, the Fed can exploit the money multiplier to control aggregate deposits by simply exercising strict total reserve control. In turn, total reserve and money stock control can stabilize the price level.

In addition, strict total reserve control yields the following important benefits. First, it frees the Fed from having to choose a path for the Federal funds rate from one week to the next. When the Fed makes policy by choosing the level of the Federal funds rate as it has traditionally done, the Fed must decide to raise the Federal funds rate in order to maintain control of total reserves and the money stock when credit demands put upward pressure on interest rates. Since these decisions are always the focus of national debate, they are very difficult for the Fed to make at all, let alone with appropriate timing. By contrast, if the Fed adopted strict total reserve control, it could maintain control of the money stock and the price level precisely because it would not be put in a position of having to continually make politically sensitive decisions. Moreover, such a policy would also leave interest rates free to adjust automatically to regulate, and coordinate intertemporal production, consumption, saving, and investment decisions in the economy.

Second, in coming years political pressure to keep interest rates down in order to help finance large Federal government budget deficits could become a particular problem. Such pressure amounts to an effort to shift financing of government expenditure from explicitly legislated taxes and borrowing to the Federal Reserve inflation tax.[12] Strict total reserve control offers good protection against such pressure.

Third, strict total reserve control is a simple policy. It could be easily monitored by the public. Since it is a passive policy there would be no problem guessing Fed policy intentions as there is today whenever the Fed adjusts the funds rate. This would greatly help the Fed to establish and maintain the credibility of its policy commitment to control the money stock and the price level. In turn, this should reduce interest rate variability due to variability of expected inflation.

5. Historical Evidence on the Feasibility of Total Reserve Targeting

A Fed move to total reserve targeting seems to have been delayed by doubt that the banking system would be able to manage its reserve position at all if the Fed did not routinely make reserves available on demand at a temporarily stabilized Federal funds rate or through the discount window. However, historical evidence suggests that such doubt is unwarranted. For example, for roughly 30 years immediately prior to the establishment of the Federal Reserve System in 1914, the United States was on a gold standard. The monetary base was ultimately determined by factors affecting the U. S. balance of payments and the world supply and demand for gold. For this reason the monetary base was largely predetermined on a weekly or monthly basis and could not respond immediately to reserve market conditions. The portion of the monetary base available to serve as bank reserves was the residual after the demand for currency was satisfied. Apart from periods of panic, the demand for currency was relatively stable, and therefore the stock of bank reserves (total reserves) was largely predetermined on a weekly or monthly basis as it would be today with strict total reserve targeting.[13]

During this period, the United States did not have a central bank. Yet banking, including reserve management, was carried out effectively throughout the period. The overnight call money rate, a rate roughly equivalent to today's Federal funds rate, did not dis-

[11] Goodfriend [January/February 1982] contains a more general discussion of money stock determination.

[12] See Auernheimer [May/June 1974] and references contained therein for theoretical discussions of the revenue from money creation.

[13] For a general discussion of the monetary history of this period, see Friedman and Schwartz [1963], Chap. 3.

play variability too excessive for the banking system to handle.[14] Furthermore, it appears that the call money rate often moved around considerably without affecting longer term rates very much. 'This last point suggests that an increase in Federal funds rate variability associated with strict total reserve targeting today would not translate into greater variability in longer term rates.

The years prior to 1914 did feature a number of banking panics, suggesting that the monetary arrangements of the period were defective. However, such panics would most likely not have happened with strict total reserve targeting. The panics were characterized by widespread demand, on the part of the public to convert deposits into currency. With the monetary base largely predetermined, such bank "runs" produced large declines in total reserves of the banking system and thereby threatened the solvency of the banks. Under strict total reserve targeting, the Fed would simply accommodate the increased demand for currency without letting the stock of total reserves decline. Strict total reserve targeting would thereby insulate the banking system from the sort of violent liquidity crises and panics that characterized the years preceding the Fed.

In the years before the establishment of the Fed, the U. S. Treasury held a large cash position and there is evidence that at times it carried out open market operations to add or drain bank reserves in order to stabilize interest rates on a short-term basis.[15] Such Treasury behavior was probably useful in cushioning temporary disturbances to interest rates. Today, under total reserve targeting the Fed could allow Treasury open market operations to influence total reserves available to the banking system by targeting total reserves inclusive of Treasury cash.[16] Because the Treasury has an incentive to economize on holdings of cash and because it would not have the power to create monetary base, Treasury interventions in the money market would be temporary and self-reversing.[17]

All this is important because the Fed is usually viewed as facing a tradeoff between short-term control of total reserves and interest rate stability. But no such tradeoff need exist for the government as a whole if total reserves are targeted inclusive of Treasury cash. Should it want to, another agency of the U. S. government, namely the U. S. Treasury, could cushion money market rates against temporary disturbances. Furthermore, the division of responsibility for price level stabilization and temporary stabilization of money market rates between the Fed and the Treasury would allow each to pursue its objective more singlemindedly.

6. Excess-Reserves and Total Reserve Control

As discussed in Section 4 above, the degree to which total reserve control translates into control of reservable deposits depends largely on the aggregate behavior of excess reserves. Theory suggests that at all but very low interest rates the volume of excess reserves will be stable enough over time so that strict total reserve control will provide effective control of reservable deposits, and thereby effective control of the price level.[18]

Over shorter periods of time, however, the ratio of banks' excess reserves to reservable deposits could vary substantially. In fact, this should be expected with strict control of aggregate total reserves. In such a policy environment, reserve market, equilibrium would be maintained by free market Federal funds rate adjustments. Increased Federal funds rate variability would probably increase the attractiveness of cash relative to Federal funds as an immediately available source of funds to meet deposit withdrawals. Consequently, banks would likely hold more excess reserves, on average, to provide more protection against having to meet unexpected deposit withdrawals. Furthermore, banks may not only hold a higher average ratio of excess reserves to reservable deposits, but in so doing banks may well allow the ratio to fluctuate more in order to meet unexpected deposit withdrawals, especially those anticipated to be temporary.

Admittedly, such bank behavior would limit the extent to which total reserve control could produce money stock control over short periods of time. However, such money stock variability would not interfere with secular monetary or price level control if the

[14] See Macaulay [1938], pp. A141-61 for a monthly series on the call money rate and 90-day rates from 1857 to 1937.

[15] See Friedman and Schwartz [1963], pp. 125-8.

[16] Total reserves could also be targeted inclusive of reserves supporting Treasury deposits at banks, so that changes in Treasury deposits would also affect bank reserves. Of course, by targeting total reserves net of Treasury cash and reserves supporting Treasury deposits, the Fed would not have to allow Treasury behavior to influence total reserves of the banking system.

[17] See Lang [October 1979] for a discussion of Treasury cash management.

[18] See Frost [July/August 1971] and Poole [December 1968] for two examples of theoretical work on excess reserve demand.

Fed maintained strict control of total reserves. Moreover, the aggregate ratio of excess reserves to deposits would probably be negatively correlated with interest rate movements, thereby helping to cushion interest rate movements. Interest rate increases, for example, by inducing banks to economize on non-interest-earning excess reserve holdings, would allow deposit expansion which would, in turn, help mitigate the interest rate rise. Far from being a problem for the Fed, such variation in the aggregate excess reserve ratio would make it easier for the Fed to adhere to strict total reserve control, and thereby increase the credibility of a policy of secular monetary and price level control.

A higher average volume of excess reserve demand under strict total reserve control could, however, be a problem for the Fed. Banks might object to strict total reserve control because it could cause them to tie up a greater share of their assets in non-interest-earning excess reserves. Assuming that the Fed makes available a sufficient once-and-for-all increase in total reserve supply to satisfy the increased demand for excess reserves necessary to support an initial level of aggregate deposits, the Fed portfolio will increase along with the move to strict total reserve control. Since virtually all of Fed earnings on its portfolio are simply transferred to the U. S. Treasury, the move to strict total reserve control could provide the U. S. Treasury with significant additional revenue.[19] The Congress and the Treasury could view the move to strict total reserve control as a means of raising additional revenue through the "reserve" tax on banks. Alternatively, by allowing the Fed to pay interest on required reserves, Congress could offset the cost to banks of holding additional excess reserves. In other words, this bank objection to strict total reserve control could readily be overcome with cooperation from the Congress.

7. Total Reserve Control and the Deregulation of Interest on Deposits

In recent years, the Depository Institutions Deregulation Committee, in accord with a congressional mandate, has removed interest rate ceilings on a wide variety of deposit types.[20] Interest rate ceilings have become difficult to enforce technologically, legally, and fairly. Consequently, the trend toward virtually complete interest rate deregulation appears irreversible. Recognizing this trend, the Federal Reserve Board has recently recommended repeal of the existing prohibition of interest on demand deposits. In addition, the Federal Reserve Board has recommended payment of interest on required reserve balances held at Federal Reserve Banks.[21]

These two reforms would greatly enhance the value of strict total reserve control. In the first place, by allowing market related interest on fully checkable deposits and interest on required reserves, these reforms would reduce or eliminate the incentive for financial intermediaries to create alternative means of providing transaction services that pay market related rates. In other words, the reforms should bring to an end the relabeling of deposit arrangements to avoid legal restrictions that has characterized financial innovation in recent years. Furthermore, because the spreads between interest rates on various deposit types should be much less sensitive to the level of interest rates, the reforms should also lead to greater stabilization of the volume of each deposit-type demanded and its turnover for transaction purposes. With deregulation, it is possible that transaction accounts might contain a substantial portion of savings-type deposits. But this should not be a problem because interest rate movements would produce only minor shifts over time in the composition of this aggregate.

With deregulation, even if competition induces transaction deposit rates to move together with market rates so that transaction deposit demand no longer depends on interest rates, strict total reserve control could still exert control of transaction deposits through a money multiplier as described in Section 4. In this case, the price level would be determined by the public's real demand for transaction deposits which would primarily depend on real income. How would the system respond to temporary disturbances?[22] Consider a disturbance temporarily creating unwanted excess reserves. The banking system would respond by extending new temporary loans and aggregate deposits would rise correspondingly. Transaction balances will only rise if prices or real income rise, thereby affecting the quantity of transaction balances demanded. To the extent that the

[19] See Goodfriend and Hargraves [March/April 1983], pp. 11-13.

[20] The Congressional mandate stems from the Depository Institutions Deregulation and Monetary Control Act of 1980 (Public Law 96-221).

Friedman [February 1970] contains a good discussion of interest rate controls.

[21] See Partee [November 1983].

[22] This illustration draws on the framework developed in Goodfriend [January/February 1982].

disturbance is understood to be temporary, the public will be willing to temporarily hold the increase in aggregate deposits as nontransaction balances. Alternatively, if the disturbance is anticipated to be permanent and not offset by a Fed reduction of total reserves, then the price level and both transaction and nontransaction deposits will rise equiproportionally. In short, strict total reserve targeting remains a workable means of price level control even with interest rate deregulation.

By contrast, the usefulness of a Federal funds rate monetary control instrument as typically understood could be greatly diminished if market-related rates were paid on fully checkable deposits. As usually understood, a funds rate instrument is effective only if the funds rate significantly affects the opportunity cost of holding money. If the own rate on transaction accounts is legally and effectively fixed, then funds rate control, by affecting market interest rates, significantly influences the opportunity cost of holding money and can be used for monetary control. But without legal deposit rate restrictions, if competition induces deposit rates to move together with market rates, then the funds rate may have little effect on deposit demand.[23] In such a situation, as typically understood the funds rate loses its effectiveness as an instrument of money stock and price level control.

Of course, by using the funds rate to influence the level of interest rates and the quantity of bank loans, it could in principle be manipulated to influence spending and the price level. At a minimum, such use of a funds rate instrument requires rethinking its role in the transmission of policy. More importantly, use of a funds rate instrument in this way would continue to be plagued with problems similar to those described in Section 4.

8. Fed Attitude Toward the Federal Funds Rate in the Last Two Days of the Reserve Maintenance Period

Under the new contemporaneous reserve requirement rules for transaction deposits, the required reserve maintenance period lags the computation period by two days. This means that for the last two days of the maintenance period required reserves are predetermined as they were during the entire maintenance week under the old lagged reserve requirement rules. Since required reserves could no longer adjust to total reserve supply, the Fed might be tempted to hold the funds rate at an "appropriate" level-during those two days and simply let reserve supply accommodate the demand, thereby minimizing unnecessary funds rate volatility.

However, if banks came to expect the Fed to peg the funds rate at an "appropriate" level on the last two days of the reserve maintenance period, then the benefits to strict total reserve targeting under CRR could be seriously jeopardized. Since a dollar of reserves held in the last two days of a maintenance period is equivalent to a dollar held on any other day, banks would neither pay more nor offer less than that "end of period rate" at any time during the period. This would mean that the funds rate throughout the period would in effect be fixed as if the Fed had been using a funds rate instrument explicitly. Reserve demand would simply be accommodated at the end of the period at the "appropriate" rate, and even though CRR were in place, reserves would not be the effective instrument of monetary control. In fact this procedure would amount to another form of noisy funds rate targeting, with possibly more interest rate variability and poorer monetary control than under the nonborrowed reserve-lagged reserve requirements operating procedure employed following the October 1979 move to reserve targeting.

For CRR to be used for true reserve targeting it is critical that the Fed establish the precedent that it will not peg or cushion the funds rate in the last two days of the reserve maintenance period. This is a necessary condition to induce banks to adjust their reserve positions on an ongoing basis throughout the reserve maintenance period, rather than wait for the Fed to provide them with reserves at some "appropriate" funds rate at the end of the period. In other words, this is a necessary condition to induce banks to manage their reserve positions in a way that could make total reserve control work.

9. Timely Release of Aggregate Reserve and Transaction Deposit Information

The efficiency of strict total reserve control with CRR would be enhanced by the timely release of aggregate deposit and reserve data by the Fed. As it currently stands, the Fed releases money stock and reserve data too late to be of use for banks managing

[23] The payment of interest on required reserves would lead deposit rates to move even more closely with market rates.

Since the interest rate on currency is zero, a funds rate instrument will still affect the opportunity cost of holding currency. But the interest sensitivity of currency appears to be too low to provide a practical funds rate instrument means of monetary control.

their reserve positions.[24] Such information would help banks forecast reserve market conditions and the Federal funds rate more accurately. Banks could make use of better funds rate forecasts to hold reserves during that part of a maintenance period when the funds rate is expected to be lowest. In turn, such intertemporal arbitrage by banks would tend to cushion funds rate movements within a given reserve maintenance period.

To make the procedure work best, i.e., with least cost to banks and least funds rate variability, it makes sense for the Fed to put more resources into collecting, compiling, and publicizing information on reserve market clearing conditions each day of the maintenance period. In this regard, the Fed might encourage the forward Federal funds market so as to provide hedging possibilities and aggregate information to banks. In fact, such a market might grow substantially of its own accord should the Fed adopt strict total reserve control.

10. Federal Funds Rate or Nonborrowed Reserve Targeting with Contemporaneous Reserve Requirements

Contemporaneous reserve requirements are beneficial for implementing monetary policy because they make it easier for the Fed to control total reserves. The value of strict total reserve control has been discussed in Section 4. At this point, it is useful to ask what portion of the benefits of CRR could be obtained with Federal funds rate or nonborrowed reserve targeting.

With Federal funds rate targeting, the Fed holds the funds rate within a narrowly specified target band, adjusting the band gradually over time to affect the level of short-term interest rates as desired. Reserves are merely supplied as required to support the volume of money and credit demanded given economic conditions and the targeted level of short-term interest rates. Consequently, with Federal funds rate targeting, reserve requirement rules in general, and contemporaneous reserve requirements in particular, are virtually irrelevant to the implementation of policy. They merely affect the timing and volume of reserves held by banks, the size of the Fed portfolio, Fed income, and transfers from the Fed to the U. S. Treasury.[25]

With nonborrowed reserve targeting, the Fed supplies a predetermined volume of nonborrowed reserves and lets the Federal funds rate and the volume of discount window borrowing adjust to clear the reserve market. Even with CRR, nonborrowed reserve targeting gives the demand for discount window borrowing a central place in the operating procedure. Unfortunately, as mentioned in Section 3, both theory and experience make clear that there are major problems for a monetary control procedure relying on the demand schedule for borrowed reserves.

However, in spite of these difficulties nonborrowed reserve targeting is still favored by some because of its supposed interest rate cushioning properties. Even if such interest rate cushioning were desirable, discount window borrowing is a poor means of producing it. When the funds rate falls below the discount rate, discount window borrowing essentially dries up, and nonborrowed reserve targeting becomes equivalent to total reserve targeting. When the funds rate is above the discount rate, discount window borrowing can cushion interest rate movements. However, the interest rate cushioning varies in a complicated way over time due to expectational effects and intertemporal nonprice rationing policy at the discount window, Furthermore, rules penalizing duration of borrowing at the window introduce a needless cycle into interest rates and reserve supply.[26]

In short, nonborrowed reserve targeting still introduces a pattern in interest rates due to Fed policy, but this pattern results from Fed discount window administration procedures rather than from explicit management of the funds rate by the Federal Open Market Committee. Furthermore, since the pattern has no benefits for monetary policy, it tends to drive the Fed to manage nonborrowed reserve supply to better manage interest rates. Consequently, even with CRR nonborrowed reserve targeting can not be expected to deliver workable or credible strict reserve and monetary control. Nonborrowed reserve targeting simply does not offer any of the benefits of total reserve targeting discussed in Section 4.

11. Summary

Whether or not the move to contemporaneous reserve requirements makes a difference for monetary policy is entirely up to the Fed. With Federal funds

[24] Board of Governors of the Federal Reserve System. [January 1984a].

[25] See Goodfriend and Hargraves [March/April 1983] for an extensive historical discussion of this point.

[26] These features of interest rate cushioning due to Fed discount window administration can be deduced from the model in Goodfriend [September 1983]. The cycling is due to the negativity of λ_1 in that model.

rate targeting, CRR will essentially make no difference. This article has argued that the potential benefits of moving to CRR are likewise not available with nonborrowed reserve targeting. The promise of CRR for implementing monetary policy can only come with a move to strict total reserve control.

Above all, strict total reserve control promises the Fed a means of stabilizing the money stock and the price level without having to choose a Federal funds rate target as it has traditionally done. In contrast to the Federal funds rate procedure, which requires frequents and timely adjustment by the Fed, strict total, reserve control would be a passive policy requiring little if any month-to-month adjustment. Total reserve control is consequently more likely to deliver monetary control and price level stability. A move to total reserve control would moreover offer good protection against pressure to help finance Federal budget deficits. In addition, strict total reserve control would allow interest rates to automatically regulate and coordinate economic decisions. Finally, strict total reserve control could be easily monitored by the public, which would allow the Fed to build credibility for its commitment to price level stability.

In the years before the Federal Reserve System, the United States was on a gold standard and did not have a central bank. The volume of total reserves was largely predetermined on a weekly or monthly basis as it would be today under strict total reserve targeting. Evidence from that period makes clear that strict total reserve targeting is feasible. U. S. Treasury interventions in the money market at that time probably stabilized money market rates somewhat. But today, with total reserve targeting, the Fed could also allow the Treasury the ability to temporarily stabilize money market rates by targeting reserves inclusive of Treasury cash. Moreover, this division of responsibility for price level stabilization and money market stabilization between the Fed and the Treasury would allow each objective to be pursued more effectively.

Apart from discussing the promises of CRR for implementing monetary policy, this article has pointed out some pitfalls that could prevent the Fed from obtaining the full benefits of CRR. From the point of view of using CRR for strict total reserve control, the two-day lag of the maintenance period relative to the computation period under the new CRR rules is inefficient, because for the last two days of the maintenance period reserve requirements are lagged as they were before February 1984. To the extent that the Fed deliberately stabilizes the Federal funds rate during the last two days of the maintenance period and banks come to anticipate this, the control procedure will operate like Federal funds rate targeting prior to October 1979. It was also argued that while nonborrowed reserve targeting appears to be a reasonable alternative to total reserve targeting, in fact, it is not likely to operate effectively. In addition, the benefit of more timely release of aggregate reserve market information by the Fed as an aid to bank reserve management was pointed out. Finally, it was recognized that banks might object to strict total reserve control if it leads them to hold more excess reserves, but Congress could offset this cost by paying interest on required reserves.

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ON NONNEUTRAL RELATIVE PRICE EFFECTS IN MONETARIST THOUGHT: SOME AUSTRIAN MISCONCEPTIONS*

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The resurgence of monetarism has been one of the more Celebrated developments in postwar macroeconomic thought. Since Milton Friedman's influential 1956 restatement of the quantity theory of money [5], monetarism has become increasingly prominent in policy deliberations and academic theorizing alike. Matching this rise has been a corresponding revival of interest in the monetarist view of the monetary transmission mechanism-i.e., the mechanism or process that links money to nominal income and through which the economy adjusts to, monetary changes.

This article deals with the monetarist version of the monetary mechanism as expounded by Friedman and his late-19th and 20th century American quantity theory predecessors; in particular, it deals with a key misconception concerning that view. More precisely, it examines the Austrian School's contention that monetarists invariably ignore relative price and real output effects in the monetary mechanism. The term Austrian here of course refers to those modern followers of the monetary overinvestment business cycle theories of Ludwig von Mises and Friedrich A. Hayek. Those theories explain how monetary-induced declines in the rate of interest from its real equilibrium level stimulate overinvestment of capital in projects that prove unsustainable once the rate returns to equilibrium.

'Austrians' Antimonetarist Critique

According to at least three modern Austrians, monetarists concentrate solely or largely on money's long-run neutral equilibrium impact on the general price level and neglect or ignore the temporary nonneutral real-sector effects of monetary changes. This allegation, which has its historical roots in von Mises' and Hayek's criticism of the quantity theory of money, has received its most recent statement in Norman P. Barry's article on "Austrian Economists on Money and Society" in the May 1981 issue of the ***National Westminster Bank Quarterly Review.*** Says Barry :

> Orthodox monetarists concentrate on changes in the general price level brought about by monetary expansion or contraction; all prices are assumed to move up. or down uniformly. This is maintained partly because holistic magnitudes such as the general price level are easily observable, and partly because money is always assumed to be neutral (that is an economy is more or less in equilibrium so that the effect of monetary disturbance is not on the structure of relative prices). [1 ; p. 23]

By contrast, Austrians, according to Barry, do not neglect nonneutralities or relative price effects of monetary shocks. On the contrary they emphasize such effects and the resulting disruption of real activity.

> For the Austrians, however, the change in the structure of relative prices is crucial and monetary disturbance produces discoordination throughout the economy. [1; p. 23]

Barry's remarks are echoed by Gerald O'Driscoll and Sudha Shenoy, who argue that monetarists, unlike Austrians,

> . . . ignore, the real side of the economy and hence the real maladjustments brought about by a monetary policy that interferes with the coordination of economic, activities. [They] implicitly assume. that the real side of the economy is always in some sort of long-term equilibrium, in which money influences only the price level or money income and not the structure of relative prices or the composition of real output . . . . [M]onetarists appear to be unaware of the real effects of money on the economic system-money's effect on individual prices and price interrelationships and hence on the whole structure of outputs and employments. [9; pp. 185, 193]

In short, according to O'Driscoll and Shenoy, monetarists (1) ignore "the structure of production and

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the influence of prices on production," (2) neglect "the microeconomics of business cycles," and (3) adhere exclusively to a Walrasian general equilibrium model that fails "to find any place for money in the pricing process" and that gives money "no role in determining relative prices" [9; pp. 193, 194].

The purpose of this paper is to suggest (1) that the foregoing views are mistaken, (2) that monetarists do *not* neglect nonneutral relative price or real economic effects of monetary shocks, (3) that, on the contrary, they (or at least some of them) fully incorporate these elements into their analysis of the monetary transmission mechanism, (4) that, in fact, their concern for these effects is what motivates their advocacy of stable monetary policy (indeed, why would they care about sharp swings in the money stock if those swings had no real output and employment effects), (5) that, if anything, they may recognize an even greater number of relative prices or relative yields than do the Austrians, (6) that, with the possible exception of a singular Austrian concern for the composition (as opposed to *level)* of real output, there is little difference between the two views of the monetary mechanism, and (7) that, consequently, the notion that the Austrian view is unique is a myth. In order to document these points, the paragraphs below examine the writings of six prominent American monetarists or quantity theorists-namely Alexander Del Mar, Irving Fisher, Clark Warburton, Milton Friedman, Karl Brunner, and Allan Meltzer -to show what they had to say about nonneutralities and relative price effects of monetary disturbances.

Before doing so, however, it should be noted that the preceding assertions are in no way intended to belittle Austrian views of the working of the monetary mechanism. Rather the purpose is to suggest that many of those views-notably the notions of the first-round injection effects of monetary disturbances, of the misleading price signals produced by an artificial money-induced lowering of the interest rate, of the consequent overinvestment of capital and unsustainable increase in the capital intensity of production, and of the necessity of a depression to work off the excess capital stock-have their exact counterparts in at least some monetarists' versions of the monetary mechanism. With this in mind, let us proceed to the first monetarist to be considered, namely Alexander Del Mar, the first director of the U.S. Bureau of Labor Statistics and author of several important late 19th century writings on monetary theory and history.

Alexander Del Mar (1836-1926)[1]

The notion that quantity theorists invariably overlook or abstract from the real effects of monetary changes is quickly dispelled by a glance at Del Mar's 1896 volume *The Science of Money.* In that book he expounded at least five ideas that constitute the hallmarks of both the Austrian and monetarist views of the monetary mechanism.

He distinguished, first, between *static equilibrium analysis* (in which all prices vary equiproportionally with money so that neutrality prevails) and *dynamic disequilibrium* analysis (in which individual prices adjust nonuniformly such that money exerts a temporary nonneutral impact on real variables). Static equilibrium analysis, he said, teaches that "a doubling of the sum of money will result in a doubling of price" such that neutrality holds [2; p. 185]. By contrast, dynamic disequilibrium analysis reveals that when the money stock alters,

> prices do not move together, and the change from a large to a small currency, or vice versa, is by far the most important economical circumstance that can influence the [real] affairs of a nation. [2; p. 177]

That is, monetary causes, via their differential effect on individual prices, can have real consequences.

Second, having asserted the real significance of money-induced nonuniform price movements, he attempted to specify the exact sequence in which individual prices adjust to a monetary shock. Specifically, he argued that prices adjust in the following order :

> 1. Bullion. 2. Stocks and bonds. 3. Shares of incorporated companies. 4. "Staples," or crude and imperishable commodities. 5. Merchandise, including perishable commodities, crude articles of subsistence, etc. 6. Fabric[ated goods], such as machinery, manufactured food, articles for wear, etc. 7. Landed property, or real estate. 8. Skilled labour, or artisans' wages. 9. Unskilled labour, or the wages of labourers, soldiers, seamen, etc. 10. Professional services, or the emolument of authors, inventors, lawyers, engineers, clergymen, account: ants, and other professional and clerical classes. [2; p. 186]

In short, he argued that asset prices adjust faster than raw material prices, raw material prices faster than final product prices, and the latter faster than the prices of productive factors.

Third, he pointed out that, because prices do not adjust uniformly, monetary shocks necessarily distort

[1] On Del Mar, see Tavlas [10].

the structure of relative prices and thereby disrupt production and discoordinate economic activity. As he put it,

> to increase money, or permit it to increase, is not merely to enhance all prices simultaneously: it is to enhance the price of some things in point of time before others . . . [The result] is to derange and throw into disorder all the varied and complicated interests of society. [2; p. 188]

Similarly, to contract the money supply

> is to depress the prices of certain commodities sooner than others, and to occasion a derangement of affairs even more perilous to society; for . . . a [nonuniform] fall of prices hinders commerce and depresses production, and thus deprives labour of employment or tangible existence. [2; p. 188]

Here, contrary to Austrian contentions, is one early monetarist's recognition of the relative price/real output effects of monetary disturbances. To prevent these disturbances, he recommended that money's growth be stabilized at a constant rate equal to the trend growth rate of real output, estimated by him to be 3.3 percent per year [10; p. 18].

Finally, although he did not (like the Austrians) discuss how monetary expansion alters the time structure of production and leads to an overinvestment of capital, he did state that the new money causes the real rate of interest temporarily to fall below its equilibrium level, thereby lowering the real cost of borrowing relative to final product prices and the expected return on investment. The resulting rise in actual and anticipated profit, he said, induces a corresponding rise in the demand for loans to finance new investment projects. Eventually the rise in loan demand bids the real rate into equilibrium, but not before additional new investment projects have been started. Here is Del Mar's recognition that the monetary mechanism embodies an interest rate-investment channel-the same channel emphasized in the Austrian approach.

Irving Fisher (1867-l 947)

The next monetarist to be considered is Irving Fisher, the famous monetary reformer, pioneer econometrician, and America's foremost quantity theorist. A careful reading of his work reveals that he did not neglect the relative price and resource allocation effects of monetary changes. On the contrary, he asserted that such effects always occur during transitional adjustment periods, periods in which individual "prices never do move in perfect unison" with each other or with the money stock [3; p. 184].

Thus in Chapter 9 of his famous *The Purchasing Power of Money* (1911)-a chapter devoted to a discussion of "the dispersion of prices"-he argues that the existence of such inhibiting factors as contractual restraints, legal prohibitions, and the inertia of custom render individual prices sticky such that they adjust at different speeds to monetary shocks. The result, he noted, is to alter the structure of relative prices and therefore the pattern of real output. Distinguishing between the long-run neutrality and short-run nonneutrality of monetary changes, Fisher states that

> The chief conclusion of our previous study is that an increase of money, other things equal, causes a proportional increase in the level of prices. In other words, the p's in the sum EpQ tend to rise in proportion to the increase in money. It was noted, however, that the adjustment is not necessarily uniform, and that if some p's do not rise as much as in this proportion, others must rise more. In this connection, we observe that some prices cannot adjust themselves at once, and some not at all. This latter is true, for instance, of prices fixed by contract. A price so fixed cannot be affected by any change coming into operation between the date of the contract and that of its fulfillment. Even in the absence of explicit contracts, prices may be kept from adjustment by implied understandings and by the mere inertia of custom. Besides these restrictions on the free movement of prices, there are often legal restrictions; as, for example, when railroads are prohibited from charging over two cents per passenger per mile, or when street railways are limited to five-cent or three-cent fares.
>
> Whatever the causes of nonadjustment, the result is that the prices which do change will have to change in a greater ratio than. would be the case were there no prices which do not change. Just as an obstruction put across one half of a stream causes an increase in current in the other half, so any deficiency in the movement of some prices must cause an excess in the movement of others. [3; p. 184, 185]

The resulting change in relative prices stemming from these differential individual price movements alters the composition of real output. For,

> as each p changes, the "Q connected with it will change also; this, because usually any influence affecting the [relative] price of a commodity will also affect the consumption of it. [3; p. 194]

This alteration in the output mix, Fisher noted,

> introduces a new complication. We have in many of our previous discussions been assuming, as was admissible theoretically, that all the Q's remain unchanged while we investigate the changes in the p's due to changes in the currency or in velocities of circulation. But practically we can never get an opportunity to study such a case. [3; p. 194]

In other words, monetary shocks invariably entail relative price and real output effects. These effects cannot be disregarded by the analyst. Austrians could hardly put it more convincingly.

Real Wage/Employment Effects : Fisher's Phillips Curve Analysis

Of the relative prices affected by monetary shocks, Fisher emphasized two, namely real wage rates (i.e., nominal wages deflated by commodity prices) and *real interest rates* (i.e., nominal yields corrected for inflation), In his seminal 1926 *International Labour* Review article entitled "A Statistical Relation Between Unemployment and Price Changes"-now recognized as the first rigorous statistical analysis of the Phillips curve tradeoff between unemployment and inflation,[2] he argued as follows regarding the real wage effects of monetary changes. He noted first that nominal wages ("which are fixed sometimes either by contract or custom, for at least a number of months") tend to adjust to monetary changes less rapidly than do product prices. Thus real wages fall when money and prices are increasing and rise when money and prices are falling. Assuming that employers' demand for labor (hiring) varies inversely with real wages, it follows that monetary expansion temporarily stimulates employment and monetary contraction temporarily depresses it. In other words, according to Fisher,

> the ups and downs of employment are the effects, in large measure, of the rises and falls of prices, due in turn to the inflation and deflation of money and credit. [4; p. 502]

Here is Fisher's recognition of one important nonneutrality (namely the employment effect) of money. This emphasis on the short-run nonneutrality of money is even more pronounced in his treatment of the real interest rate effects of monetary changes, effects which constitute the core of his theory of the business cycle.

Real Interest Rate Effects

With respect to these real interest rate effects he argued as follows: Suppose the money supply increases, thereby putting upward pressure on prices. Suppose further that the price rise is initially unanticipated and therefore is not immediately incorporated into nominal rates. Because sluggish nominal interest rates do not at first rise as fast as product prices, real rates fall below their equilibrium level (the expected profit rate on new capital investment). Businessmen, desiring to take advantage of this rate disparity, step up their real loan demands. Assuming banks accommodate these loan demands and that the increased real loans are used to finance new real projects made possible by the inflation-induced overemployment of labor and other resources, it follows that real output rises. In Fisher's words, "Trade (the Q's) will be stimulated by the easy terms for loans" [3 ; p. 61]. This is the expansion phase of the cycle.

According to Fisher, the expansion ends when the sluggish nominal rate finally adjusts completely to the rate of price increase and the real rate returns to its equilibrium level. The economy, however, does not stabilize at this point. Instead, the rise in the real rate precipitates a wave of business bankruptcies that trigger fears of the soundness of banks. These fears in turn prompt a run on banks, a drain of cash reserves, a financial crisis, and ultimately a collapse of the money supply. Fisher explains :

> With the rise of interest, those who have counted on renewing their loans at the former rates and for the former amounts are unable to do so. It follows that some of them are destined to fail. The failure (or prospect of failure) of firms that have borrowed heavily from banks induces fear on the part of many depositors that the banks will not be able to realize on these loans. Hence the banks themselves fall under suspicion, and for this reason depositors demand cash. Then occur "runs on the banks," which deplete the bank reserves at the very moment they are most needed. Being short of reserves, the banks have to curtail their loans. It is then that the rate of interest rises to a panic figure. Those enterprisers who are caught *must* have currency to liquidate their obligations, and to get it are willing to pay high interest. Some of them are destined to become bankrupt, and, with their failure, the demand for loans is correspondingly reduced. This culmination of an upward price movement is what is called a crisis,-a condition characterized by bankruptcies, and the bankruptcies being due to a lack of cash when it is most needed. [3; pp. 65-66]

As a result of this crisis and the drain of bank reserves, the money stock falls, prices fall, and (because the nominal rate does not adjust as fast as product prices) real rates rise above their equilibrium level. The result is a decline in the real demand for loans and the level of real activity financed by those loans. The cycle enters its depression phase, a phase triggered by the preceding crisis and its panic-induced shrinkage of the money stock.

Fisher and Austrian Business Cycle Theory

Fisher's analysis, appearing as it did in his 1911 *The Purchasing Power of Money* fully one year before von Mises' *The Theory of Money and Credit,* presaged much of the Austrian theory of the trade

[2] Indeed, Fisher's paper has been reprinted in the March/April 1973 issue of the Journal of Political Economy under the title "I Discovered the Phillips Curve."

cycle. That this is so and that Fisher (as well as Del Mar) deserves credit for anticipating some of the essentials of the Austrian approach is evident from a comparison of the two views. For, contrary to the Austrians' contentions, such comparison reveals that Fisher's' monetarist theory of the cycle is virtually the same as the Austrian theory in several key respects. Not only did he, like the Austrians, see monetary disturbances as the dominant cause of the business cycle, but, like them, he also viewed the cycle as the outcome of real reactions to the purely monetary shocks. And like them, he emphasized the relative price and real output effects of monetary changes.

In particular, like the Austrians, he highlighted the role of a disequilibrium real interest rate as a transmitter of misinformation and a discoordinator of production. Specifically, he argued that when an inflationary monetary injection pushes the real rate below its equilibrium level, the result is a misleading price signal that directs too many resources into capital-intensive projects, projects that would not be justified at the equilibrium rate. He even uses the same terminology as the Austrians, speaking of "maladjustments in the rate of interest" that "beguile" business borrowers to "overinvest" [3; p. 66]. Like his Austrian counterparts, he recognized that depression is the necessary and inevitable outcome of the capital overinvestment of the preceding boom.

Also, like the Austrians, Fisher recognized how interest rate changes can alter the time structure of production and thus the composition (mix) of output. He did so when he stated that a money-induced "movement of interest will tend to make the prices," and hence real quantities, "of different [goods] vary in different directions or to different extents" depending upon their relative, capital intensities [3; p. 193].

Finally, like the Austrians, Fisher maintained that although the economy is always tending toward steady-state equilibrium, it rarely attains it before fresh shocks occur. Consequently, dynamic disequilibrium is the normal state of affairs. For,

> While the pendulum is continually seeking a stable position, practically there is almost always some occurrence to prevent perfect equilibrium. Oscillations are set up which, though tending to be self-corrective, are continually perpetuated by fresh disturbances. [3; p. 70]

It follows that :

> Since periods of transition are the rule and those of equilibrium the exception, the [monetary] mechanism . . . is almost always in a dynamic rather than a static condition. [3; p. 71]

Although a monetarist, Fisher here exhibits two characteristics of the Austrian School: first, a belief that the economy is virtually always out of steady-state equilibrium, and second, an emphasis on equilibrating processes rather than equilibrium positions per se.

These similarities make it difficult to distinguish Fisher's cycle theory from the Austrians'. Moreover, they hardly support the notion of a unique Austrian view of the monetary mechanism.

Clark Warburton (1896-1979)

Fisher was neither the first nor the last monetarist to stress the nonneutral relative price effects of monetary changes: he was followed in the 1940s and 1950s by Clark Warburton. It was Warburton who, almost singlehandedly, revived and continued to use the quantity theory of money throughout the heyday of the Keynesian revolution at a time when research on monetary factors was all but dead: That he fully recognized money's temporary relative price effects is evident in his statement that a monetary-induced

> change in the level of prices is a process which takes a period of time, and affects prices of various items sequentially rather than simultaneously. [This sequential adjustment occurs because] some prices are greatly influenced by custom or contract and move less readily than other prices; specifically, wages and contractual elements in business costs tend to be sluggish relative to price of output. [The result is that] the process of adjustment to the new price level required by the changed quantity of money . . . produces price differentials, which increase or reduce the profitability [and hence production incentives] of business. [11; pp. 28, 86]

In other words, due to the lag of wages and other costs behind prices and the resulting impact on profits, monetary changes have real effects. Specifically,

> monetary deficiency . . . is the major cause of business depression and declining employment. Monetary expansion at a more rapid rate than economic progress, on the other hand; is the major cause of business recovery and increasing employment. . . . [11; p. 87]

This statement hardly indicates a disregard of the short-run nonneutrality of money. To prevent such nonneutralities and their underlying monetary causes, Warburton favored stabilizing money's growth at a constant rate equal to the differential growth rate between output and velocity.

Warburton on Monetary Injection Effects

Warburton likewise stands exonerated from the particular charge that monetarists ignore the non-

neutral first-round injection effects of monetary disturbances (i.e., the initial real-sector effects stemming directly from the way new money enters into the circulation). This charge stems from the Austrians' allegation that monetarists unanimously assume that new money is distributed equiproportionally (and therefore neutrally) across cashholders as if by helicopter drop. By contrast, Austrians contend that new money in fact enters the economy at a specific point and thereby temporarily raises prices at that point relative to prices elsewhere. That Warburton, although a monetarist, adhered to this latter Austrian view is evident from his discussion of injection effects. Monetary injections, he said,

> are felt, first, in some particular part of the economy and spread from that part to the rest of the economy through the medium of price differentials created at each stage of adjustment. [11; p. 85]

Evidently Austrians are mistaken in holding that monetarists invariably adhere to the helicopter model.

Milton Friedman

The preceding has documented that earlier generations of monetarists did not ignore temporary nonneutral relative price and real output effects of monetary changes. Still, the view persists (especially among some Austrians) that the current generation of monetarists overlook these effects. Indeed, O'Driscoll and Shenoy characterize Milton Friedman's view of the monetary mechanism as one that "entirely ignores the microeconomic pricing process" and that totally neglects "money's effect on individual prices and price interrelationships" [9; pp. 191, 192].

This charge, however, is refuted by Friedman's own portfolio-adjustment explanation of the transmission mechanism, an explanation that stresses how substitution out of excess money holdings into a broad spectrum of financial and real assets changes the relative yields of those assets and their prices relative to the price of new output. Tracing a chain of causation from increasing money to rising real balances to a fall in the implicit convenience and security yield on holdings of those real balances and thence to cashholders' attempts to switch into higher yielding nonmoney assets, he argued that the result will be a rise in the prices (fall in yields) of those assets relative to the cost (yield) of producing them new. This differential, in turn, will stimulate spending to produce real output of those assets. Says Friedman of these relative price and real output effects :

> An increased rate of monetary growth . . . raises the amount of cash that people and businesses have relative to other assets. The holders of the now excess cash will try to adjust their portfolios by buying other assets . . . . However, as people *attempt* to change their cash balances, the effect spreads from one asset to another. This tends to raise the prices of assets and to reduce interest rates, which encourages spending to produce new assets and also encourages spending on current services rather than on purchasing existing assets. That is how the initial effect on balance-sheets gets translated into an effect on income and spending. [7; pp. 24-25]

Thus, far from neglecting relative prices or yields, Friedman recognizes a myriad of them-far more than are recognized by Keynesians (who also employ a portfolio-adjustment model) and probably more than are recognized by the Austrians. Indeed he points out that the main difference between Keynesian and monetarist analyses of the transmission mechanism is in the range of assets and interest rates considered.

> The difference in this area between the monetarists and the Keynesians is not on the nature of the process, but on the range of assets considered. The Keynesians tend to concentrate on a narrow range of marketable assets and recorded interest rates. The monetarists insist that a far wider range of assets and of interest rates must be taken into account. They give importance to such assets as durable and even semi-durable consumer goods, structures and other real property. As a result, they regard the market interest rates stressed by the Keynesians as only a small part of the total spectrum of rates that are relevant. [7; p. 25]

Friedman's stress on a whole host of relative prices makes him comparable to the Austrians, who also stress these components. It should be noted, however, that Friedman also stresses one additional relative price effect largely ignored by Austrians, namely a real wage/employment effect. Thus, in his famous 1967 presidential address to the American Economic Association [6], he points out how, owing to workers' misperceptions of inflation and the resulting lag of nominal wages behind prices, an unanticipated monetary change can temporarily alter real wages and thus the level of employment. In sum, far from ignoring relative prices in the monetary mechanism, Friedman recognizes more of them than do the Austrians.

Karl Brunner and Allan Meltzer

Other well-known modern monetarists who, like Friedman, emphasize nonneutral relative price effects in the monetary mechanism include Karl Brunner and Allan Meltzer. Their contributions have recently

been summarized by David Laidler. He states that Brunner and Meltzer

> . . . had already developed a view of the transmission of monetary impulses in asset markets that stressed the role of relative prices as signalling devices, and found it easy enough to extend that line of reasoning to the markets for output and labor services as well. [8; p. 10]

More precisely, Brunner and Meltzer argue (1) that a monetary expansion initially lowers the implicit convenience and security yield on real cash balances relative to the yields on other assets, (2) that this fall in money's relative yield induces a substitution out of cash balances into a broad range of noncash assets, (3) that the resulting increased demand for those assets lowers their yields and raises their prices, (4) that, in particular, such substitution raises the prices of existing real capital assets and consumer durable goods relative to the costs of producing them new, and finally, (5) that this price-cost differential encourages production of those real assets. In this way, monetary impulses spread sequentially across a heterogeneous array of assets, temporarily affecting relative asset prices as well as the prices of those items relative to the prices of newly produced goods, This view, with its emphasis on money-induced changes in the structure of prices and thus-the composition of demand, is remarkably similar to its Austrian counterpart, which likewise stresses these effects.

Conclusion

The preceding paragraphs have documented that, contrary to the contention of some Austrian writers, monetarists did not neglect nonneutralities and relative price effects in their analysis of the monetary mechanism. On the contrary, monetarists, like Austrians, stressed these effects. Moreover, as documented above, monetarist and Austrian theories of the business cycle share many of the same or similar characteristics. Because of this, the two approaches should be seen as complementary rather than as competing. The similarity between the two views also casts doubt on the notion of a unique Austrian view of the monetary mechanism.

Whatever their similarities or differences, the two views yield the same policy insight, namely that monetary disturbances are capable of producing severe disruptions to the real economy and for that reason should be avoided. True, the two schools differ over how monetary stability is to be achieved. Monetarists, with their disapproval of discretionary intervention and monetary fine-tuning, generally advocate some form of a constant monetary growth rate rule. By contrast, Austrians, with their desire to transfer monetary control from the government to the private sector, advocate the abolition of central banks in favor of either strict adherence to a gold or other commodity standard or reliance on a regime of freely competing private fiat currencies. Apart from these and other important differences (such as the Austrians' desire for swift monetary deceleration versus the monetarists' policy of gradualism), both schools agree that money must be stabilized and that the pursuit of active (discretionary) countercyclical monetary policy by unconstrained central banks is ***not*** the way to do it. On this fundamental point, as on the importance of relative price effects in the monetary mechanism, the two schools are in concurrence.

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EQUALIZING REGIONAL DIFFERENCES IN WAGES: A STUDY OF WAGES AND MIGRATION IN THE SOUTH AND OTHER REGIONS

William E. Cullison

Economic theory predicts that real wage differentials across geographical areas will not persist so long as there is free trade or free factor mobility among the areas. Persistent real wage differentials among regions of a country such as the United States would therefore be puzzling because, in addition to free trade, there is free movement of capital and labor. It is, however, part of the nation's folklore that real wages are persistently lower in the South despite a rather substantial migration into the Southern region. As Sahling and Smith (SAS) pointed out in a 1983 study of regional wage differentials [3],

> Since the beginning of this century, wages in the South had remained not only lower than in the North but also substantially lower than in every other region of the country. Early studies attributed the regional differentials in money wage to variations in the quality of the labor force, in the industrial or occupational mix, severity of discrimination by race or sex, etc. After controlling for these factors, wages were still observed to be lower in the South. [3, p. 131]

Mancur Olson's 1983 presidential address to the Southern Economics Association, entitled provocatively, "The South Will Fall Again: The South as Leader and Laggard in Economic Growth," restates this economic folklore. Interpreting the results of a study by Charles Hulten and Robert Schwab [1], Olson noted,

> Their estimates are full of paradoxes that are utterly inconsistent with any standard neoclassical story. . . . The labor moves away from the high wage regions to the relatively low-wage South and other growing regions in large quantities; a large part of the growth of these regions is due to increases in employment. Labor, in other words, moves to the regions where its marginal product is lower. [2, p. 922]

Olson explains the apparent, deviation from standard economic theory by union growth and a subsequent cartelization of labor markets.

> Why would workers go through the costs and upheaval of migration to move from where wages were high to where they were low? If there had been no cartelization and free entry in the labor markets of the Northeast and the older Middle West the workers could in general have enjoyed higher wages by staying at home. But if, as has been argued here, there were cartelized supra-competitive wage levels in the older and long-stable regions of the country, employers would not want to take on many of the workers who would have liked employment with them, so these workers had no choice but to move to the South or other growing regions to take lower-paying jobs. [2, p. 922]

Suppose, however, that real wages in actuality were not lower in the South than in other areas. Sahling and Smith's 1983 study, noted briefly earlier, also bore a provocative title, "Regional Wage Differentials : Has the South Risen Again?" Their analysis concluded that

> . . . real wages for both male and female workers are sharply lower throughout the Northeast than for comparable urban workers in the South. Moreover, these real differentials widen between 1973 and 1978. . . . In 1978, money wages for males were lower throughout the Northeast than for comparable workers in the South. For females, money wages remained slightly higher in the New York area than for comparable workers in the South but were lower in the rest of the Northeast than in the South. [2, p. 134]

If Sahling and Smith are correct, the migration patterns noted by Olson are quite consistent with "any standard n&classical [economic] story."

This article is devoted to an examination of regional wage differentials, with particular emphasis on the South. It builds upon the work of Sahling and Smith by testing the robustness of their results using an alternative methodology and a less controversial definition of the South.[1] It also extends their analysis

[1] Sahling and Smith included the Washington, D.C.-Maryland-Virginia and the Baltimore SMSAs in the South region. Although there were legitimate reasons for placing those two SMSAs in the Southern region, the inclusion led some critics to dismiss their conclusions on the grounds that their study was biased toward higher wages in the South. The empirical work for this study does not place Baltimore and Washington in the Southern region.

to 1981. The article confirms their results and concludes that, contrary to folklore and Mancur Olson, the South is not a low wage area any longer, if it ever was.

The article is divided into five sections. The first describes methods of analysis. The second examines real and nominal wages in standard metropolitan statistical areas. The third presents empirical findings from a broader sample of workers that includes those who live in rural and small urban areas. The final two sections summarize the findings and present the major conclusions of the study.

Methods of Analyzing Wage Differentials

This section includes a discussion of the statistical techniques used in this study and the Sahling and Smith study. It can be skipped by readers interested solely in statistical results rather than statistical methods.

The Sahling and ***Smith (SAS)*** Technique Sahling and Smith's study was designed to compare wage differentials of similar workers in similar jobs. Their article thus addresses the question of whether an individual worker in one region would be likely to earn higher wages in a similar job in another region. They do not attempt to explain regional differences in the overall average wage, which can be quite different. The overall average wage differential is affected, for example, by regional differences in occupational and industrial mix, while the average regional wage differential of like workers in like jobs is not.

To determine wage differentials of similar workers in similar jobs, Sahling and Smith (SAS) used a wage regression. They hypothesized that wages were a function of age, education[2] martial status, race, veteran status, ethnicity (Spanish), occupation,[3] industry,[4] number of jobs held, union membership, sex, and region. Instead of including variables to represent region and sex, however, separate regressions were run for workers of each sex who lived in each of five regions of the country. One set of regressions used actual dollar wages earned as the dependent variable, another used wages adjusted for differences in regional costs of living.[5] Since the method used to derive estimates of regional wage differentials from the regressions mentioned above is complicated, the following example of the technique may be useful.

Suppose that one is comparing the New York City area to the South. After estimating regression equations for wages in the New York City area and the South based upon the labor force and occupational characteristics mentioned above, SAS computed arithmetic means of each such characteristic for the two areas. They then plugged each set of arithmetic means into the regression equation for the other area and computed a predicted wage.

Taking a particular instance, suppose the set of means described the New York City area. When average values of the independent variables describing workers who reside in the New York City area are plugged into the South regression, the resulting figure estimates the average wage that the New York City area work force would have earned if it had moved to the South. This estimate-is compared to the actual average wage of workers in the New York City area.

Similarly, the arithmetic means of the independent variables that describe the South are also plugged into the New York City area regression. The resulting figure predicts the average wage of the Southern workers if they had moved to the New York City area. This predicted wage is then compared to the actual average wage of the Southern workers.

As a result, the Sahling and Smith analysis yields two different wage differentials for each region, thereby raising the question of which differential is more nearly correct. Sahling and Smith discuss this dual differential dilemma and outline an ideal (but complicated) technique for resolving it. Arguing that each differential represents an extreme case, however, they opt for simplicity and average the two differentials for each region.

While the exact meaning of the averaged differential is unclear, the gains from simplification presumably justify their approach. The conclusions of their study, however, were so contrary to conventional wisdom that it seemed desirable to test the robustness of their approach.

The Peer Group Technique This study uses an alternative technique to adjust for regional differences in workers and jobs. This method, labelled the

[2] The age groups are 14-19, 20-35., 35-64, and 65-75. The educational groups are, no education, l-5 years, 6-9 years, 10-13 years, 14-16 years, and 17 or more years.

[3] Professional, manager, sales, clerk, craftsman, operative, laborer, or service worker.

[4] Agricultural, mining and construction; manufacturing, durables or nondurables ; transportation, communications or public utilities; wholesale trade; retail trade; finance, insurance and real estate; business services;. personal services; professional services; or public administration.

[5] The cost-of-living adjustments are from the BLS's release on average budgets for intermediate income families of four for selected urban areas.

peer group technique, apportions individuals into small groups made up of their exact peers classified by all of the criteria (except region of residence) used by Sahling and Smith for their analysis of wage differentials. After each peer group is determined, the average wage of those group members who live in the South is calculated and the wage of each non-Southern individual is recorded as a ratio of the Southern average wage. The procedure thus yields a set of wage ratios for each peer group-the number corresponding to the number of individuals in the group who do not reside in the South. After determining the set of relative wages in every peer group, the ratios are summed across peer groups by region, averaged, and tested to see whether the resulting average regional wage differentials were statistically significantly different from one.[6]

This technique has an advantage over the SAS method because the researcher knows how many workers in any given sample are strictly comparable. It also yields a standard error that enables the researcher to estimate the odds that a wage differential for like workers in like jobs actually exists, i.e., is not a result of random sampling error. It also adjusts for all possible interaction between the regional and the individual characteristics, something that is very difficult to do with the SAS method.

So much for the advantages of the peer group method. The disadvantage of the method is that it requires a very large sample. This requirement makes the method's results somewhat suspect for the studies of wage differentials in 1981 and 1983. For that reason, this study also calculates wage differentials by the SAS method for those years.

The Data Set Data were taken from the May 1978, May 1981, and April 1983 Current Population Surveys (CPS). These monthly census surveys provide the household data on employment status from which the Department of Labor calculates the unemployment rate. Although the CPS surveys are quite large, only a quarter of those surveyed are currently asked to reveal their earnings (in 1978 all workers were asked the wage question). Sahling and Smith restricted their study to workers living in the 29 largest SMSAs in order to adjust their data for regional differences in costs of living. As a result, the subsamples that they eventually analyzed included only 13,502 workers in 1973 and 13,147 in 1978.

For 1978, wage data (average hourly earnings to be exact) were available for 45,900 workers, 16,800 of whom resided in SMSAs. The analysis of nominal wage differentials from statewide data, discussed subsequently, is based upon this 45,900 worker sample, whereas the analysis of nominal wage differentials from SMSA data utilizes the 16,800 worker sample. The sample size for the study of real wage differentials was a smaller 13,853, because the cost-of-living data[7] were available only for the 29 largest SMSAs.

The usable subsample was reduced drastically in 1981 as a result of economy measures taken by the Government. Only 15,200 workers were asked to reveal their wages in that year. Of these, 5,600 lived in SMSAs, and only 4,600 lived in large SMSAs. The usable subsample in 1983 included 14,565 workers, of whom 5,407 lived in SMSAs.

Empirical Result-Workers Who Reside in SMSAs

Chart 1 shows nominal regional wage differentials of workers who resided in SMSAs in 1978, 1981, and 1983, and real wage differentials of workers who resided in one of the 29 largest SMSAs in 1978 and 1981. The lines on the charts show the wage differentials as percentages of wages in the South area. Each chart shows wage differentials calculated both by the SAS and peer group methods, mentioned earlier, and (for comparison) the regional differences in overall average wages. This last-mentioned comparison is derived simply by averaging everyone's wages in a region and comparing that average to the average wage in the South. The chart, of course, only summarizes the detailed findings, which are presented in tabular form in the Appendix.

The chart shows clearly that in 1978, regardless of the method used, real wages in the South were substantially higher than in all other regions except the West. This result is consistent with the SAS study. In 1981, the last year for which a regional cost-of-living index was published, Southern real wage rates

[6] In actuality, the wage data were transformed into logarithms, so the test was translated into a test to see whether the log of the wage differential was significantly different from zero. The standard error calculated was the standard error of the difference between sample means, paired observations,

$$S_{\bar{d}} = \sqrt{\frac{\Sigma_j D_j^2 - (\Sigma_j D_j)^2/n}{n(n-1)}},$$

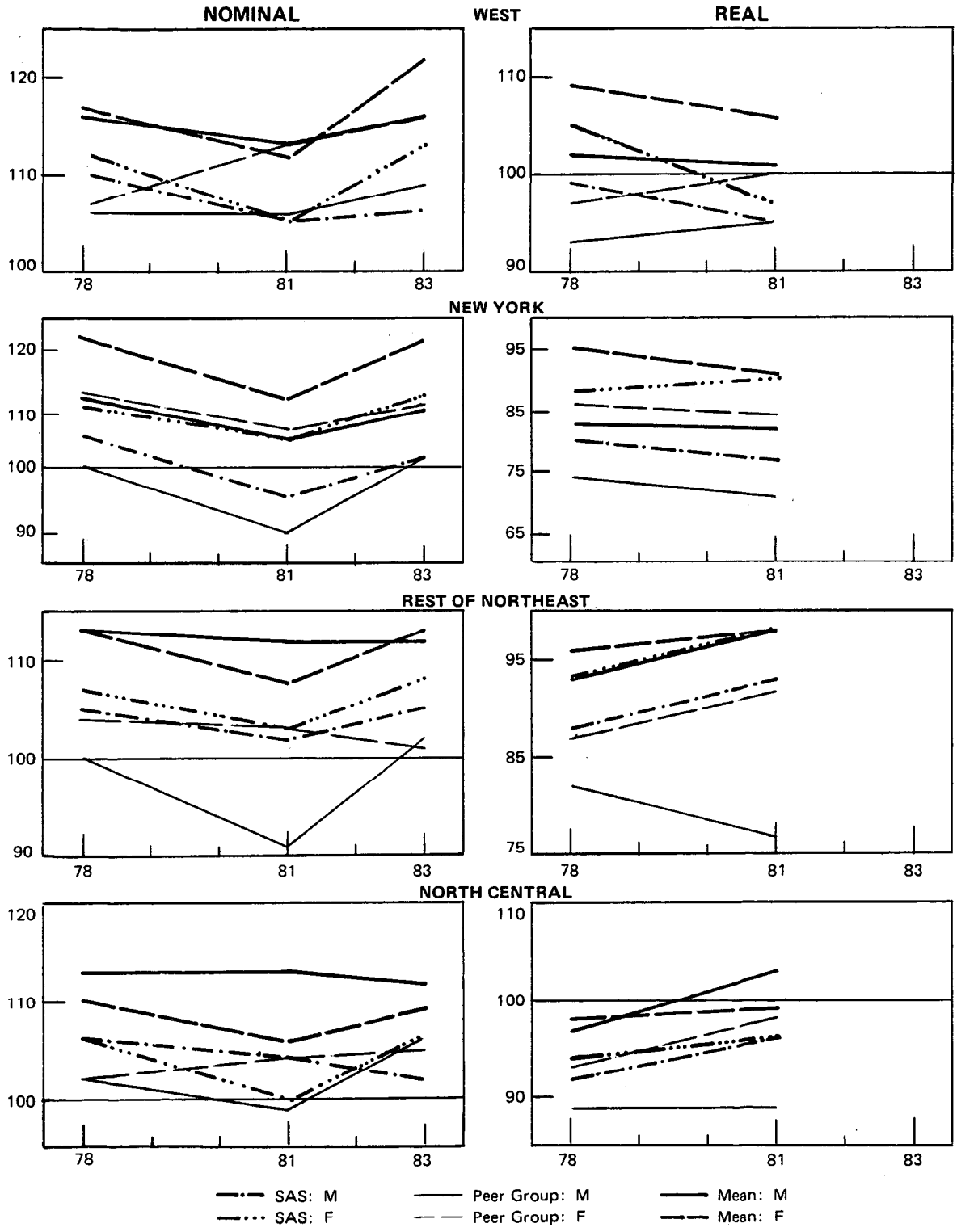
when D is the difference in the paired observation. A description of the test is provided in Steel and Torrie [4, p. 78-79].

[7] This study used the same type of cost-of-living data as that mentioned in footnote 5. The sources were News, Bureau of Labor Statistics, USDL 79-305 and USDL 82-139.

Chart 1

REGIONAL WAGE DIFFERENTIALS OF WORKERS WHO RESIDE IN SMSAs

(Percent of South)



remained above those in the North East regions regardless of the measurement method. According to the peer group method, real wages in the South were higher than wages in any other region in 1978 and 1981. Chart 1 also shows nominal wages plotted for the three years. This chart shows, surprisingly, that *nominal* wages were higher in the South in 1981 than for comparable males in the New York City, the' rest of the North East, and North Central areas.

These last results are similar to those found by Sahling and Smith for 1978 reported in the quote at the beginning of this article, although the wage differentials shown in the chart are not strictly comparable to those found by Sahling and Smith. First, SAS defined the South to include the Washington, D.C.-Maryland-Virginia and the Baltimore SMSAs. Secondly, the *nominal* wage data include wages of workers from all SMSAs in a given region, not just the 29 largest SMSAs.

Table I shows the actual wage differentials estimated in the SAS study compared to the wage differentials estimated by the peer group method for 1978. For this table Washington and Baltimore were included in the South. As the table shows, the implications of the two methods for North-South regional wage differentials are approximately the same. The peer group method shows a larger Southern advantage in relative real wage payments than the SAS results, however. Chart 1 also illustrates that relatively high nominal wages continued in the South in 1981.

The results of the peer group analysis for 1981 and 1983 should be viewed with some skepticism, however, because of the smaller, sample sizes included. As is shown in the Appendix, for example, only 89 New York City area workers sampled in 1981 and 132 in 1983 had counterparts in like jobs in the South. The smaller sample sizes may explain a very puzzling result, namely the New York-South nominal wage differential for males in 1981. The finding that nominal wages for males were 10 percent higher in the South than in the New York City area in that year is implausible (the SAS method shows South wages to be only 4 percent higher). The time profile of the differential, from 101 percent in 1978 to 90 percent in 1981 to 102 percent in 1983, heightens that implausibility. The result is indicated by the data, however (and it is statistically significant at the 2 percent level), so it is reported here.

More Empirical Results-Workers Classified Into Regions From Statewide Data

This section's analysis will be limited to nominal wages, since cost-of-living data are not available by state. For this analysis the data set was larger, and workers were grouped into eight regions; the South, the Mid-Atlantic, New England, East North Central, West North Central, West South Central, Mountain, and Pacific.

All of these divisions except the South and the Mid-Atlantic regions follow Standard Census Division Codes. The South includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The Mid-Atlantic division includes Delaware, the District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.

Chart 2 shows nominal wages in 1978, 1981, and 1983 in each of these regions. As in Chart 1, the lines represent percentage wage differentials esti-

Table I

SAHLING AND SMITH DATA COMPARED TO DATA DERIVED FROM THE PEER GROUP METHOD, 1978

(Percent of South)

	Nominal Wages				Real Wages			
	Males		Females		Males		Females	
Region*	SAS	Peer Group	SAS	Peer Group	SAS	Peer Group	SAS	Peer Group
New York City	98	100	102	108	85	80	88	87
Rest of North East	95	95	93	98	88	83	86	86
North Central	101	100	98	99	97	91	94	92
West	103	102	102	105	98	96	97	100

* Washington and Baltimore are in the South.

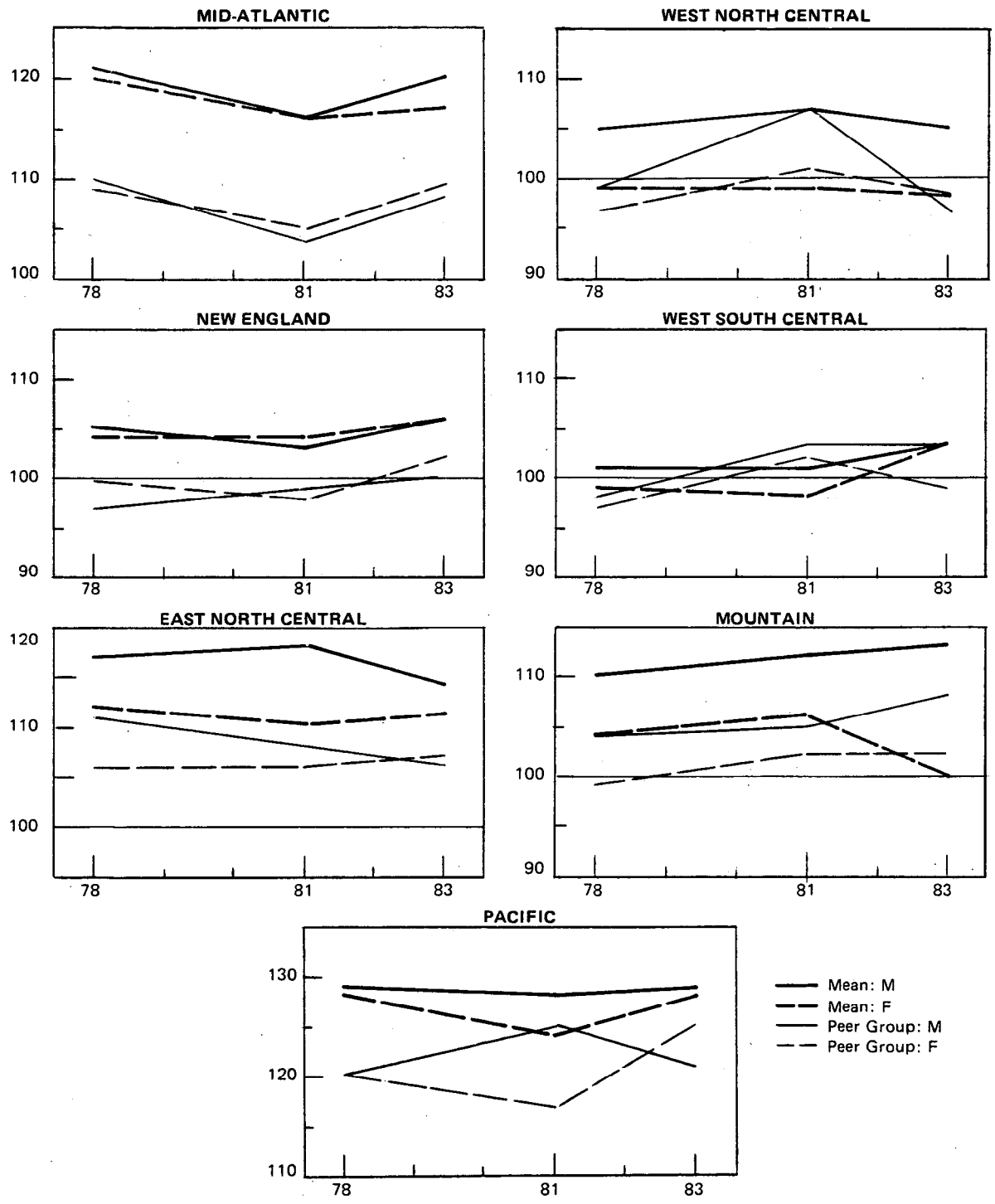
Sources: Sahling and Smith [3, p. 134]; derived from May 1978 Current Population Survey, USDL 79-305 and USDL 82-139.

Chart 2

REGIONAL WAGE DIFFERENTIALS FROM STATEWIDE DATA

RELATIVE WAGES BY REGION

(Percent of South)



mated by the SAS and the peer group methods compared to the overall average wage differential. As the chart shows, overall average nominal wages in the South are consistently lower than wages. in other regions of the country. When the data are adjusted to compare like workers in like jobs, however, the wage differentials narrow, and wages in the South become relatively higher in a few regions.

In 1978, for example, wages were higher in the South than in the West South Central, West North Central, and New England areas, according to the peer group comparisons. In 1981, Southern workers earned lower nominal wages than their counterparts in every region other than New England. In 1983, the position of Southern wage-earners slipped relative to their counterparts in New England but improved relative to the West North Central area.

Wage differentials for comparable workers were highest in the Pacific region in each of the three years. The Pacific area includes California, Washington, Oregon, Alaska, and Hawaii.

The peer groups plotted on Chart 2 are not classified by union membership status, since (1) the statewide data include rural areas that are particularly unlikely to be heavily unionized in the South and (2) union membership status was not available on the April 1983 CPS tape. The results of the peer group method both with and without the union membership criterion, however, are shown in the Appendix.

Overview of Empirical Results

As Table A-1 shows, average real wages of SMSA dwellers in the South in 1978, even with no adjustment to compare like workers in like jobs, were higher than wages in every other region of the country except the West. When the peer group technique was used to compare like workers in like jobs (see Table A-2), real wages of SMSA dwellers in the South were found to be higher than every other region.

By 1981 the situation had changed slightly. As Table A-1 also shows, average real wages of SMSA dwellers for North Central males had moved higher than the Southern average, although the West retained its advantage. After adjustments to compare similar workers in similar jobs (see Table A-3); real wages for males were higher in the South, as they were in 1978. Real wages for Southern female SMSA dwellers, on the other hand, were found to be higher than wages of peers in the entire North East, but only about equal to real wages of peers in the North Central and West regions.

With respect to nominal wages, wages of males living in Southern SMSAs in 1978 appeared to be about equal to nominal wages for like. workers in New York, the Rest of the North East, and the North Central regions. Nominal wages of urban Southern males in 1981 were higher than those of their counterparts in every region except the West, according to the peer group results. By 1983, nominal wages of Southern males had moved lower than those of their counterparts in any other region, although the differentials for the New York City and Rest of the North East areas were not statistically significant.

Nominal wages for Southern females were significantly lower in 1978 than wages of like workers in all regions except the North Central. In 1983, their wages were significantly lower than their counterparts in all other regions except the Rest of the North East.

When wages of residents of rural and small urban areas were included in the analysis, nominal wages of Southern male workers were not significantly different from wages of their peers in the New England, West North Central, and West South Central regions, although they were low relative to the other regions, particularly the Pacific and Mountain areas. Relative wages of Southern females followed approximately the same pattern except that their wages were not significantly lower than their peers in Mountain states.

Wages for males who live in the Pacific area were found to be 20-25 percent higher than wages of comparable males in the South. Without cost-of-living data, however, it is difficult to evaluate these relative wage differentials meaningfully. The relative cost of living in parts of the Pacific area, particularly in Alaska and Hawaii, is substantially higher than in the South, but it is difficult to speculate about the overall difference in costs of living. One must use other evidence to infer information about relative real wages.

Implications of the Empirical Results

As noted at the outset, neoclassical economic theory predicts that individuals, jobs, or commodities will move in a way designed to equalize real wages. This article has shown that, whether measured by the peer group method, by the SAS method, or by a simple averaging process, real wages for workers residing in SMSAs in 1978 and 1981 were higher in the South

than in all areas except the West. Table II shows, as theory would have predicted, that the 1970-1980 population gains were highest in the South and West, where real wages were highest, and the population decline was largest in the New York City area, where real wages were lowest.

Economic theory also would predict that the Southern real wage advantage should not persist. Consistent with this prediction, the regional real wage differentials narrowed between 1978 and 1981 in all categories except New York and West males. The statewide nominal wage differentials also imply that whatever real wage advantage that the South may have had in 1978 was narrowed somewhat by 1983.

As noted previously, the conclusions of the analysis are not so clear-cut when one examines statewide cost-of-living differences. However, since (1) Table II shows that total -population increased substantially in the South, West, and West South Central regions between 1970 and 1980, (2) Table II also shows that population changes corresponded roughly to real wage differentials (according to the SMSA data) for 1978 and 1981, and (3) economic theory predicts that workers migrate to take advantage of wage differentials (as well as for other reasons, such as job availability); it seems reasonable to infer that the migration of non-SMSA dwellers is also induced by relatively high real wage levels.

Thus, contrary to the Mancur Olson statement quoted at the outset of this paper, this article finds no evidence that workers have moved away from *high-wage* regions to the relatively low-wage South, and therefore no evidence of paradoxes for neoclassical economic theory. In fact, in the case of workers who reside in SMSAs, the article found that real wages in the South were relatively higher than in most other regions of the country, with or without adjustments to make jobs and workers comparable.

Table II

COMPARISON OF WAGE DIFFERENTIALS OF SIMILAR WORKERS IN SIMILAR JOBS AND POPULATION CHANGES BY REGION

SMSA Data	Percentage Change in Population 1970-1980	Percent of South: Real Wages, 1978, Peer Group, Males	Real Wages, 1978, Peer Group, Females	Real Wages, 1978, SAS Method, Males	Real Wages, 1978, SAS Method, Females	Real Wages, 1981, SAS Method, Males	Real Wages, 1981, SAS Method, Females
New York	- 6.04	74	86	80	88	77	90
Rest of North East	- 1.33	82	87	88	93	93	98
North Central	2.2	89	93	92	94	96	102
West	15.4	93	97	99	105	95	103
South*	27.4	100	100	100	100	100	100

Statewide Data	Percentage Change in Population 1970-1980	Percent of South: 1978 Nominal Wages Peer Group, Males	1978 Nominal Wages Peer Group, Females	1981 Nominal Wages Peer Group, Moles	1981 Nominal Wages Peer Group, Females
Mid-Atlantic	- 0.48	105	105	101	106
New England	4.2	97	99	95	99
East North Central	3.5	106	104	107	103
West North Central	5.2	98	96	98	99
West South Central	22.9	100	97	106	95
Mountain	37.2	104	98	102	103
Pacific	19.8	116	116	130	117
South	20.7	100	100	100	100

* Washington and Baltimore are in "Rest of North East."

Sources: U. S. Department of Commerce. Census of Population and derived from May Current Population Surveys, USDL 79-305 and USDL 82-139.

In a sense, it would have been more satisfying, and made better prose, if real wages had been lower in the South. One could then have attributed the wage differential, particularly in the face of population inflows, to nonpecuniary factors. Nonmonetary amenities, composed of such diverse elements as climate, the culture, southern hospitality, the literary tradition, environmental purity, etc., have been used to explain the "Southern Condition" in the past.[8] The finding that workers may have had to be compensated by higher wages to move to the South will doubtless be unsettling to many Southerners.

[8] Proving that nonmonetary amenities give a relative advantage to the South is difficult if not impossible, but if such were proved, it would also refute Mancur Olson and resolve his so-called "paradox" for neoclassical economics.

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APPENDIX

Table A-l

AVERAGE WAGES FOR MALES AND FEMALES 1978, 1981, AND 1983

Region†	1978 Nominal Wages Average Wage $	1978 Nominal Wages Number	1978 Real Wages Average Wage $	1978 Real Wages Number	1981 Nominal Wages Average Wage $	1981 Nominal Wages Number	1981 Real Wages Average Wage $	1981 Real Wages Number	1983 Nominal Wages Average Wage $	1983 Nominal Wages Number
				MALES						
New York City	6.96	1306	5.95	1306	8.45	361	7.28	361	10.13	386
Rest of North East	7.02	1733	6.66	1593	9.02	793	8.77	702	10.29	594
North Central	6.98	2894	6.91	2721	9.13	653	9.16	615	10.31	772
West	7.19	2018	7.31	1312	9.12	779	9.01	540	10.69	617
South	6.19	1420	7.16	794	8.05	405	8.92	219	9.17	438
				FEMALES						
New York City	5.08	1003	4.33	1003	6.26	344	5.39	344	7.42	341
Rest of North East	4.69	1454	4.40	1347	6.03	685	5.81	629	6.96	592
North Central	4.57	2285	4.49	2139	5.90	569	5.87	538	6.70	737
West	4.88	1609	5.00	1032	6.28	652	6.29	445	7.50	566
South	4.16	1083	4.57	606	5.59	375	5.92	188	6.13	364

† By SMSA, South includes Atlanta*, Birmingham, Dallas*, Fort Worth*, Greensboro-Winston-Salem-High Point, Houston*, Miami, New Orleans, Norfolk-Portsmouth, Tampa-St. Petersburg. New York City area includes New York City SMSA*, Nassau-Suffolk*, Newark*, Paterson-Clifton-Possaic*. Rest of North East includes Albany-Schenectady-Troy. Baltimore*, Boston*, Buffalo*, Philadelphia*, Pittsburgh*. Rochester, Washington, D. C.-Maryland-Virginia*. North Central includes Akron, Chicago*; Cincinnati*, Clevelnd*, Columbus, Denver, Detroit*, Gary-Hammond-East Chicago*, Indianapolis*, Kansas City*, Milwaukee*, Minneapolis-St. Paul*, St. Louis*. West area includes Anaheim-Santa Anna-Garden Grove, Los Angeles-Long Beach*, Portland, Sacramento, San Bernardino-Riverside, San Diego*, San Francisco- Oakland*, San Jose, Seattle-Everett. (*denotes real and nominal wages.)

Sources: Derived from May 1978, May 1981, and April 1983 Current Population Surveys, USDL 79-305 and USDL 82-139.

Table A-2

PERCENTAGES OF AVERAGE WAGE RATES IN SOUTHERN SMSAs RELATIVE TO WAGE RATES OF COMPARABLE WORKERS IN OTHER REGIONS OF THE COUNTRY IN 1978 UNDER TWO DIFFERENT DEFINITIONS OF THE SOUTH AND COMPARED TO PREVIOUS FINDINGS*

	Nominal Wages						Real Wages					
	Sahling & Smith Method		Peer Group Method				Sahling & Smith Method		Peer Group Method			
Region†	Males	Females	Males		Females		Males	Females	Males		Females	
	Wages (% of South)	Wages (% of South)	Wages (% of South)	Number of People	Wages (% of South)	Number of People	Wages (% of South)	Wages (% of South)	Wages (% of South)	Number of People	Wages (% of South)	Number of People
New York City	106	111	101 (0.55)	499	113 (6.26)	487	80	88	74 (11.01)	376	86 (6.71)	408
Rest of North East	105	107	100 (0.04)	839	104 (2.67)	764	88	93	82 (11.70)	607	87 (7.83)	613
North Central	106	106	102 (1.61)	1527	102 (1.61)	1341	92	94	89 (9.12)	1142	93 (2.92)	391
West	110	112	106 (3.60)	816	107 (4.97)	774	99	105	93 (2.92)	391	97 (1.40)	408
Baltimore and Washington in Southern Region	Sahling & Smith Actual‡		Peer Group Method				Sahling & Smith Actual‡		Peer Group Method			
New York City	98	102	100 (0.02)	585	108 (4.45)	549	85	88	80 (10.16)	509	87 (7.39)	495
Rest of North East	95	93	95 (3.82)	703	98 (1.43)	603	88	86	83 (11.20)	561	86 (7.96)	505
North Central	101	98	100 (0.30)	1690	99 (1.31)	1460	97	94	91 (8.03)	1395	92 (7.30)	1259
West	103	102	102 (1.56)	916	105 (3.40)	861	98	97	96 (1.91)	484	100 (0.14)	473

* Figures in parentheses are "t" statistics calculated according to definition in footnote 6. If $t < 1.96$, there is assumed to be no significant wage differential.

† By SMSA, South includes Atlanta$^{\omega}$, Birmingham, Dallas$^{\omega}$, Fort Worth$^{\omega}$, Greensboro-Winston-Salem-High Point, Houston$^{\omega}$, Miami, New Orleans, Norfolk-Portsmouth, Tampa-St. Petersburg. New York City area includes New York City SMSA$^{\omega}$, Nassau-Suffolk$^{\omega}$, Newark$^{\omega}$, Paterson-Clifton-Passaic$^{\omega}$. Rest of North East includes Albany-Schenectady-Troy, Baltimore$^{\omega}$, Boston$^{\omega}$, Buffalo$^{\omega}$, Philadelphia$^{\omega}$, Pittsburgh$^{\omega}$, Rochester, Washington, D. C.-Maryland-Virginia$^{\omega}$. North Central includes Akron, Chicago$^{\omega}$, Cincinnati$^{\omega}$, Cleveland$^{\omega}$, Columbus, Denver, Detroit$^{\omega}$, Gary-Hammond-East Chicago$^{\omega}$, Indianapolis$^{\omega}$, Kansas City$^{\omega}$, Milwaukee$^{\omega}$, Minneapolis-St. Paul$^{\omega}$, St. Louis$^{\omega}$. West area includes Anaheim-Santa Anna-Garden Grove, Los Angeles-Long Beach$^{\omega}$, Portland, Sacramento, San Bernardino-Riverside, San Diego$^{\omega}$, San Francisco-Oakland$^{\omega}$, San Jose, Seattle-Everett. ($^{\omega}$ denotes real and nominal wages.)

‡ Figures derived from SAS [2, p. 137].

Sources: Sahling and Smith [2, p. 137]; derived from May 1978 Current Population Survey and USDL 79-305.

Table A-3

PERCENTAGES OF AVERAGE WAGE RATES IN SOUTHERN SMSAs RELATIVE TO WAGE RATES OF COMPARABLE WORKERS IN OTHER REGIONS OF THE COUNTRY IN 1981*

Region	Nominal Wages				Real Wages			
	Males		Females		Males		Females	
	Wages (% of South)	Number of People	Wages (% of South)	Number of People	Wages (% of South)	Number of People	Wages (% of South)	Number of People
PEER GROUP METHOD								
New York City	90 (2.52)	89	107 (1.69)	117	71 (6.09)	51	84 (4.21)	98
Rest of North East	91 (2.96)	187	103 (1.00)	274	77 (6.65)	106	92 (2.70)	177
North Central	99 (0.40)	182	104 (1.69)	253	89 (3.27)	114	98 (0.79)	186
West	106 (1.89)	193	113 (4.11)	230	95 (1.22)	93	100 (0.22)	106
SAS METHOD								
New York City	96		105		77		90	
Rest of North East	102		103		93		98	
North Central	104		100		96		96	
West	105		105		95		97	

* Figures in parentheses ore "t" statistics calculated according to definition in footnote 6. If t < 1.96, there is assumed to be no significant wage differential.

Sources: Derived from May 1981 Current Population Survey and USDL 82-139.

Table A-4

PERCENTAGES OF AVERAGE NOMINAL WAGE RATES IN SOUTHERN SMSAs RELATIVE TO WAGE RATES OF COMPARABLE WORKERS IN OTHER REGIONS OF THE COUNTRY IN 1983*

Region	Peer Group Method				SAS Method	
	Males		Females		Males	Females
	Wages (% of South)	Number of People	Wages (% of South)	Number of People	Wages (% of South)	Wages (% of South)
New York City	102 (0.40)	132	111 (3.24)	163	102	112
Rest of North East	102 (0.60)	265	101 (0.31)	282	105	108
North Central	106 (2.25)	327	105 (2.07)	327	102	106
West	109 (2.63)	235	116 (5.36)	216	106	113

* Figures in parentheses ore "t" statistics calculated according to definition in footnote 6. If t < 1.96, there is assumed to be no significant wage differential.

Source: Derived from April 1983 Current Population Survey.

Table A-5

AVERAGE WAGES

(Regions from Statewide Data)

Region†	1978		1981		1983	
	Wage ($)	Number	Wage ($)	Number	Wage ($)	Number
			MALES			
South	5.60	4962	7.20	1340	8.19	1289
Middle Atlantic	6.77	4079	8.35	1338	9.81	1285
New England	5.88	1783	7.39	679	8.67	637
East North Central	6.57	4308	8.47	1314	9.37	1069
West North Central	5.89	2454	7.67	809	8.59	765
West South Central	5.68	1917	7.30	720	8.43	777
Mountain	6.18	2563	8.03	849	9.22	740
Pacific	7.25	3439	9.24	1191	10.54	1119
			FEMALES			
South	3.83	3898	5.06	1150	5.75	1090
Middle Atlantic	4.60	3215	5.85	1162	6.72	1191
New England	3.98	1542	5.25	568	6.12	578
East North Central	4.30	3339	5.57	1064	6.39	946
West North Central	3.81	2270	5.00	707	5.63	744
West South Central	3.80	1419	4.97	558	5.94	637
Mountain	3.97	1928	5.34	674	5.77	658
Pacific	4.92	2764	6.26	987	7.35	1040

† Southern region includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. Mid-Atlantic includes Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania. Remaining regions follow standard census division codes.

Sources: Derived from May 1978, May 1981, and April 1983 Current Population Surveys.

Table A-6

PERCENTAGE OF WAGES PAID IN SOUTH BY REGIONS DETERMINED BY STATEWIDE DATA, PEER, GROUP METHOD, 1978, 1981, AND 1983*

(Workers Not Classified by Union Membership Status)

Region†	1978		1981		1983	
	Percent of South	Number	Percent of South	Number	Percent of South	Number
			MALES			
Mid-Atlantic	110 (11.98)	2917	104 (2.54)	813	108 (4.34)	758
New England	97 (2.37)	1383	99 (2.37)	436	100 (0.12)	434
East North Central	111 (14.45)	3406	108 (5.34)	846	106 (3.55)	712
West North Central	99 (1.15)	1892	107 (1.96)	531	97 (1.34)	485
West South Central	98 (1.73)	1287	103 (1.34)	351	103 (1.24)	420
Mountain	104 (3.82)	1781	105 (2.10)	467	108 (3.20)	417
Pacific	120 (17.98)	2039	125 (11.16)	603	121 (9.12)	563
			FEMALES			
Mid-Atlantic	109 (10.26)	2489	105 (4.38)	186	109 (5.78)	803
New England	100 (0.01)	1283	98 (1.15)	420	102 (1.10)	436
East North Central	106 (7.58)	2733	106 (3.77)	752	107 (4.17)	680
West North Central	97 (3.82)	1857	101 (0.47)	213	98 (1.31)	507
West South Central	97 (2.68)	1064	102 (3.19)	331	99 (0.39)	412
Mountain	99 (1.35)	1449	102 (0.79)	434	102 (1.08)	376
Pacific	120 (18.08)	1817	117 (8.71)	545	125 (12.11)	573

* Figures in parentheses represent "t" statistics.

† Southern region includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. Mid-Atlantic includes Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania. Remaining regions follow standard census division codes.

Sources: Derived from May 1978, May 1981, and April 1983 Current Population Surveys.

Table A-7

PERCENTAGE OF WAGES PAID IN SOUTH BY REGIONS DETERMINED BY STATEWIDE DATA, PEER GROUP METHOD, 1978 AND 1981*

(Workers Classified by Union Membership Status)

Region†	1978				1981			
	Males		Females		Males		Females	
	Percent of South	Number	Percent of South	Number	Percent of South	Number	Percent of South	Number
Mid-Atlantic	105 (6.26)	2618	105 (5.76)	2243	101 (0.58)	674	106 (3.40)	682
New England	97 (2.61)	1280	99 (1.06)	1234	95 (2.52)	367	99 (0.76)	376
East North Central	106 (7.91)	3151	104 (4.56)	2595	107 (4.17)	728	103 (2.13)	675
West North Central	98 (1.58)	1772	96 (4.94)	1798	98 (1.16)	469	99 (0.32)	459
West South Central	100 (0.01)	1229	97 (2.69)	1043	106 (2.05)	319	95 (2.45)	314
Mountain	104 (3.08)	1646	98 (2.22)	1399	102 (0.83)	400	103 (1.53)	396
Pacific	116 (14.14)	1796	116 (14.67)	1671	130 (9.33)	507	117 (8.17)	474

* Figures in parentheses represent "t" statistics.

† Southern region includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. Mid-Atlantic includes Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania. Remaining regions follow standard census division codes.

Sources: Derived from May 1978 and May 1981 Current Population Surveys.