Data Appendix for Blanchard and Wolfers (1999)

Throughout, italics will be used to denote variable names, as found in either primary data sources, or the accompanying dataset.

1. Shocks

The primary source of data for shocks is the OECD Business Sector Database (see www.oecd.org for further details on the data). The primary reference for the construction of our shock variables is Blanchard (1997) "The Medium Run", which describes the economic content of these data at some length. The appendix merely deals with data construction.

We start with quarterly data, and construct:

Real Interest Rate

The real interest rate, *rl*, is the nominal interest rate on long-term government securities (*irl*) less the annualized rate of inflation over the last five years (using the GDP deflator, *pgdp*).

Total Factor Productivity

We measure growth in the Solow Residual in the business sector, scaled by the labor share. That is, $\Delta tfp=(\Delta y-\alpha\Delta L-(1-\alpha)\Delta K)/\alpha$, where Y (*gdpbv*), L (*etb*), and K (*kbv*) are all real measures, covering the business sector. α refers to labor's share of nominal business sector income, imputing an average wage to employers. In terms of the OECD variables, $\alpha=wsse*etb/(gdpb*1000000)$. In order to allow measurement of variables in terms of efficiency units, we also create an index of the level of total factor productivity, *tfplevel* by cumulating our quarterly measures of Δtfp.

Labor Demand Shock

We start with a measure of nominal wages, *wsse* and deflate by the business-sector gdp deflator (*gdpb/gdpbv*), yielding a real wage measure, *w*. Deflating by *tfplevel* yields a measure of the wage in efficiency units, *wadj*. We also derive a measure of labor input in efficiency units, *nadj*, as the product of business sector employment (*etb*) and *tfplevel*.

The simplest labor demand shift variable that we construct is the negative of the natural log of the labor share, which will be equal to the log of the real wage in efficiency units, less the log of the ratio of labor input (in efficiency units) to real output in the business sector (*gdpbv*). That is, *ld0*=-ln(*wadj*)-ln(*nadj*). Clearly this measure is appropriate if the aggregate production function is Cobb-Douglas, and factor proportions adjust instantly.

However, following Blanchard (1997), we adjust the wage measure to take account of gradual adjustment of factor proportions. Thus, we replace *wadj* with a measure of weighted average of current and lagged real wages (in efficiency units):

$$\log(wstar8_t)=\lambda.\log(wstar8_{t-1})+(1-\lambda)\log(wadj_t)$$

Using annual data, Blanchard (1997) suggested a value for λ of 0.8, implying a mean lag in the adjustment of factor proportions to the wage of 4 years. Using quarterly data, an equivalent value of $(0.8)^{1/4}$ is appropriate. For each country, we set the starting value of *wstar8* equal to the starting value of *wadj*.

We then construct our measure of the labor demand shift adjusted for the slow change in factor proportions as: *ld8*=-ln(*wstar8*)-ln(*nadj*). Finally, we set this variable to equal zero in the first quarter of 1970 (or the first period in which it can be constructed). This is the variable that we refer to as the "labor demand shock" throughout the paper.

Disinflation

We generate quarterly inflation rates (*pi*) using the whole economy GDP deflator (*pgdp*). Quarterly changes in inflation, *dpi*, are then generated as a simple difference of successive inflation measures.

Having created a quarterly dataset, we multiply the *dpi* and *tfp* by four so that they represent annualized rates, and take averages of each of ourvariables over our five-year periods. When we do not have data for all twenty quarters, we simply average the quarters that we do have. This means that our the first and particularly last observations for each country are often based on a limited number of quarterly observations.

2. Institutions

The baseline specifications in our paper simply use Steve Nickell's (1997) data on labor market institutions (see particularly table 6). Nickell describes his data sources and construction of variables in that paper. In most cases, Nickell provided values for 1983-88 and 1989-94; we use a simple average of these measures. These eight variables are the benefit replacement rate (*rrate*), benefit duration (*benefit*), an instrument for spending on active labor market assistance per unemployed person (*almphat*), the tax wedge (*t*), employment protection (*empro*), union contract coverage (*union*), union membership (*uden*) and a summary measure of employer and union coordination in wage bargaining (*coord*).

We also construct time-varying measures of various institutions.

Replacement Rates

Our starting point is the OECD's Database on Unemployment Benefit Entitlements and Replacement Rates. For more details on these data, refer to chapter 8, annex 8A, in the *OECD Jobs Study* (1994). This database contains estimates of the replacement rate every second year from 1961 through 1995. We start by linearly interpolating, resulting in an annual dataset. Following OECD practice, we take averages over three family types and two income levels. We also follow exactly the OECD scheme for adjusting these series for partial coverage and data discontinuities. Thus, have measures of the average replacement rate for each country and year, at each of seven possible unemployment durations (0-3 months, 3-6 months, 6-12 months, 12-24 months, 24-36 months and 36-54 months; data are not collected beyond 54 months).

Figure 7a in our paper charts the OECD's measure, which is basically a weighted average of the replacement rate over these durations. Figure 7b charts the maximum over all family types, income levels, and unemployment durations. Our regressions use *RR1* which is an average replacement rate over the first year of an unemployment spell, and *RR25*, an average over the ensuing four years.

Employment Protection

Primary data sources are OECD (1999) and Lazear (1990). Our measure is constructed as follows:

1995-99

We use the OECD (1999) summary series of overall employment protection in the "late 1990s". Because we are interested in a time-varying series, we are limited to their "Version 1" (which includes indicators for regular contracts, temporary contracts, but not collective dismissals).

1990-94

Linear interpolation of the values for 1985-89 and 1995-99.

1985-89

Use OECD summary measure for "late 1980s". However, we are missing values for a range of countries. Using available indicators (from narrower sub-indices) to infer changes, we find that in none of these cases is there any evidence that employment protection has changed. Specifically:

- Canada: For regular employment, note no change in "regular procedural inconveniences". Summary measure of regulation of temporary employment also shows no change.
- USA: For regular employment, note no change in either "regular procedural inconveniences", or "notice and severance pay for no-fault individual dismissals". Summary measure of regulation of temporary employment also shows no change.
- Australia: For regular employment, note no change in either "regular procedural inconveniences", or "notice and severance pay for no-fault individual dismissals". For temporary employment, note no change in regulation of temporary work agencies.
- Japan: No change in summary indicator of regulation of regular employment. On temporary employment, note no change in either "maximum number of successive contracts", or in "types of work for which TWA is legal".
- New Zealand: No change in "regular procedural inconveniences" in regular employment. No information available about changed procedures regarding temporary employment.

1980-84

We have no information about changes from this period to 1985-89. Hence, assume no change.

1960-64 – 1975-79

We have Lazear's data on severance pay and notice periods from 1956-84. We construct the closest proxy we can to the OECD measure, and use percentage changes in this measure to back-cast the OECD measure.

We have a range of missing variables for both severance pay and notice periods. Missing cells are filled in as follows:

- Where Lazear has data on one measure, but not the other, we assume that the ratio of severance pay to notice in the late 1980s applied equally through history, and infer time series movements accordingly.
- Where Lazear has data on neither severance pay nor notice, we simply assume that the value through the 1980s applied equally through this earlier period.

We then turn to combining the information in these two indices. Again, we follow OECD practice as closely as possible. The OECD measure includes sub-indices for severance pay and notice periods, for several types of workers, scaling each to a 0-6 (non-linear) measure. Lazear codes severance pay and notice for a blue collar worker with 10 years experience, a group not specifically analyzed in the OECD's work. So, we devised a comparable scaling metric for this group:

Index Value	***0***	***1***	***2***	***3***	***4***	***5***	***6***
Notice period (months)	0	<1	<2	<3	<4	<6	≥6
Severance pay (months pay)	0	<1.5	<3	<5	<7	<9	≥9

Following the OECD, we take a weighted average of these indices, putting a weight of one on the severance pay and a weight of 0.75 on notice. Finally, percentage changes in this summary measure are used to backcast the OECD series through this earlier period.