Rigid Wages:

What Have we Learnt from Microeconometric Studies?

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1 Introduction

In this survey, I intend to describe the latest efforts of labor economists to analyze wage rigidity both in its existence and in its consequences in various countries, in particular the United States and France.

There has been recently a renewed interest in questions surrounding wage rigidity, a central concern of many macroeconomists. In addition, the existence of wage rigidities has been viewed by some analysts as the main reason for the high level of European unemployment, in contrast to the North-American situation. The stakes are clear enough so that I do not need to spend much time in this introduction on justifying why we should, as economists, be interested in this topic.

The structure of this paper will be the following. I will first describe a simple theoretical framework that should help us understand where nominal and real wage rigidities enter macroeconomists' views on unemployment. Then, I will carefully describe several recent American studies -- Mc Laughlin (1994); Card and Hyslop (1997); Kahn (1997); Altonji and Devereux (1999); Groshen and Schweitzer (1997) -- that all address this question of the existence of nominal rigidities and their consequences in terms of wage changes using survey data. I will also present some of the messages that emerge from the recent Bewley's (1998) analysis of the same question based on interviews of managers, union leaders,… Then, I will present all the recent European studies that I am aware of -- Goux (1997) for France; Dessy (1999) for Italy; Smith (1999) for the UK; Fehr and Goette (1999) for Switzerland – on the same topic. In the next section, I will try to discuss the implications of the potential rigidities on employment,

contrasting in particular the American and the French cases (using Card, Kramarz, and Lemieux, 1999).
Then, I will try to go deeper in the understanding of the firms behavior when they face potential
employment or wage rigidities, using once again the French situation as an example (based on Abowd,
Corbel, and Kramarz, 1999; and Abowd, Kramarz, and Roux, in progress). Finally, I will briefly
conclude.

2 Motivation: Questions and Theory

From my own reading of the various theoretical or empirical articles that have been written, I believe that
we must ask the following questions: Are nominal wages downwardly rigid ? Are real wages
downwardly rigid ? and, finally, why do wages not fall in recessions ?

Simple "old-fashioned" theory can help us understand why these questions matter in the analysis of
unemployment that, evidently, is central in our understanding of the functioning of modern economies.
My presentation is based on models well described in Malinvaud (1977) or Grandmont (1989).

Consider an economy with three commodities (output, labor, money), a firm, a household, the
government. The situation is described in Figure 1. If the couple (p,w) is right of L_2 and L_3 then the
economy is in a Keynesian unemployment regime and policies that raise demand stimulate activity
through multiplier effects. On the other hand, if the couple (p,w) is above L_1 and left of L_2 then the
economy is in the so-called Classical unemployment regime and policies that raise the profitability of
firms are required.

Now, assume that the output price p is flexible and adjusts to clear the goods market. Then, we can have involuntary unemployment and the short-run response to policy shocks depends on whether the nominal or the real wage is predetermined. In the former situation, a predetermined nominal wage, the economy has Keynesian unemployment. And going back to Figure 1, a positive demand shock shifts L_2 to the right: p increases, w/p decreases, output increases through multiplier effects.

Micro-theories that tend to generate such nominal wage rigidity are menu costs theories, staggered contracts theories, as well as theories where there is imperfect information on wages. McLeod and Malcomson' (1993) hold-up problem when there are contracts and renegotiation or Keynes' relative wage theory where workers compare their wage with those prevailing at other firms are also theories that tend to generate nominal rigidities.

Assuming as above price flexibility, but with the real wage being the predetermined variable, then the economy faces Classical Unemployment where output and employment are independent of aggregate demand. In particular, any increase in public expenditures would result in the crowding-out of private demand. Therefore, in such a situation, supply-side policies that restore profitability are needed.

Micro-theories that tend to generate real rigidities are numerous. Among them, we must cite implicit contracts, efficiency wage, bargaining or insider-outsider theories which all tend to generate real rigidities, at least in their simplest versions.

Hence, in the following sections, we will pay particular attention to the nature of the rigidity that is examined and, if so, demonstrated.

3 Lessons from Recent American Microeconometric Studies

In this section, I adopt most of the time a chronological perspective that indeed fits with an increased complexity and care taken in the econometric analysis of the problem. Furthermore, I try each time to present

1. The data sources used in the analysis

2. The period of analysis

3. The observations used

4. The measure of wage used

5. The results

6. The econometric methodology and the underlying assumptions.

McLaughlin's paper in 1994 in the *Journal of Monetary Economics* revived the analysis of the existence of wage rigidity. The data source used in the analysis is the Panel Study of Income Dynamics (hereafter, PSID) for the period going from 1976 to 1986, hence mostly a period of high or moderate inflation. As in most analyses of this problem, McLaughlin focuses on workers who did not change jobs in two consecutive years. This focus is crucial and we will discuss its validity in the final sections. The measure of compensation that he uses are two, earnings and hourly earnings.

The results can be summarized as follows:

1. He observes that there is a lot of dispersion in wage changes

2. More precisely, there are 43% of real wage cuts and 17% of nominal wage cuts which are clearly very high percentages

3. However, he finds that unions tend to induce wage compression when wages change

4. In addition, he finds that very small wage cuts and raises are not rare (hence, he does not find support for the menu costs theory)

5. Very importantly, he claims that there is little evidence of important measurement errors. Since this issue is crucial, we will repeatedly discuss it and spend some time on the treatment of measurement errors in the various studies that we examine here

6. Using time-series evidence, he shows that wage change is less than 1-to-1 with unanticipated inflation (all coefficients shown below are significantly different from 0 and the R-square of the regression is $R^2=0.84$):

$$\Delta \log w_t = 1.82 + 1.02 \boldsymbol{p}_t^a + 0.42 \boldsymbol{p}_t^u.$$

The methodology that is adopted can be described as follows.

First, McLaughlin looks for historical evidence and presents a number of them. In particular, his examination of wage cuts shows that they have historically not been rare. For instance, he finds repeated evidence of wage cuts in union contracts such as in the airline and steel industries in the 80s. One must

however remember that nominal wages in manufacturing were left unchanged by the large decline in nominal demand in the first two years of the Great Depression, (O'Brien, 1989). Hence, there also exists historical evidence of strong nominal wage rigidity.

Second, McLaughlin analyzes the PSID. As mentioned previously, his first task is to assess the quality of the wage data. Based on his own research as well as that of others, he concludes that hours are badly measured but that earnings information is correct. However, he takes into account in a simple way possible measurement errors and concludes that the above numbers are little changed: real wage cuts go from 43 to 39% after accounting for errors while the equivalent numbers for nominal wage cuts are from 17 to 12%. Accounting for measurement error, the size of the average real cut goes from 9 to 6% while the size of the average nominal wage cut goes from 12% to 8%. In fact, a lot of his statistical analysis of measurement errors is based on skewness statistics and is therefore far from being non-parametric. In addition, he does not contrast years of low inflation with years of high inflation (see Figure 2, in which all years are pooled).

In conclusion, it seems that McLaughlin believes in flexibility and finds strong evidence of it.

Shulamit Kahn, in her *American Economic Review* article (Kahn, 1997) uses the same dataset, the PSID, under a slightly longer period, 1970-1988. In addition, she focuses as usual in this literature on the non-job changers. However, despite all these similarities, she will use different measures of pay than used in McLaughlin's study. More precisely, she considers wage and salary earners. And, as will appear later, this has a strong effect on the view one has on rigidity.

To obtain her results, she uses a methodology that we present rapidly now. First, she calculates the proportion of pay changes that fall into each bar of a histogram centered around the annual median pay change (for 12 bars and 19 years). Such histograms are presented in Figure 3. Then, Kahn regresses each bar for each year on bar dummies for zero, for negative nominal change, and for 1% above and below nominal zero. Hence, she will be able to capture in some non-parametric form the importance of the various places in the distribution that are of interest (such as the spike at zero nominal change, the bars that surround the spike bar, the various bars strictly below zero nominal change).

Her results can be summarized as follows:

1. She finds strong evidence of nominal rigidity

2. She also claims to find evidence of menu costs

3. To assess the magnitude of rigidity and workers affected, she shows that there are fewer pay cuts for wage earners, 10.6%, than for salary earners, 24.3%

4. There are also fewer pay cuts for low-skilled workers than for managers

5. There is a large coefficient on zero nominal change that reflects the spike

6. There are sizeable and negative coefficients on 1% dummies above and below zero nominal wage change which are consistent with menu costs theories

7. There is a large and negative coefficient on the negative dummy for wage earners (hourly pay) that reflects downward nominal stickiness

8. However, there is a positive coefficient on the negative dummy for salary earners reflecting that pay changes are more likely if they entail a pay cut. Interestingly, she claims that this result is not due to changing usual hours.

Hence, Kahn's paper brings the non-parametric dimension to the analysis. And she appears to have less prejudices in her interpretation than was true of the previous analysis. Unfortunately, she does not incorporate in her study any assessment of the magnitude of measurement errors. Indeed, this methodology based on the analysis of histograms, albeit ingenious, may be difficult to extend because of its simplicity.

The issue of incorporating measurement errors in a non-parametric framework is addressed by David Card and Dean Hyslop' paper published in 1997. Card and Hyslop use, as before, the PSID but they also use the matched year-to-year Current Population Survey (CPS, hereafter) for the period 1976 to 1993. Hence, they have more low-inflation years that in the two previous studies. Unfortunately, the CPS does not record information on tenure at the firm. Hence, when they use the CPS, to approximate non-job changers, they concentrate on all workers that had no change in occupation together with no change in sector. Note however that this choice can bias the estimated amount of rigidity in both directions for various reasons. In their analysis, the measure they more often use is the hourly wage, concentrating mostly on workers paid by the hour, and very importantly, eliminating all minimum wage workers since, by construction, their wage must be downwardly rigid.

Their results can be summarized as follows:

1. In the data, many individuals appear to experience nominal wage reductions

2. At the same time, there is evidence of a substantial spike at zero. In the high inflation era of the late 70s, the spike amounts to 6 to 10% of the workers; in the low inflation era (mid-80s), it amounts to over 15%. They also report estimation results that show that a 1% decrease in inflation increases the proportion at the spike by 1.4%

3. Contrarily to some results presented above, they claim that there is the same amount of rigidity for workers with hourly rates than for workers with non-hourly rates.

Addressing some of the shortcomings of Kahn's analysis, their methodology takes care of potential measurement errors. In particular, they show that:

1. Even though there is evidence of rounding in reported hourly rates, this only accounts at most for 4 to 5% of the apparent rigidity

2. All in all, correcting for rounding and measurement errors, they find that between 1/4 and 1/2 of non-job changers who might have experienced a nominal cut, instead had rigid nominal wages

3. Finally, by aggregating the data at hand at a local level, they find that a market-level analysis displays no effect of inflation on the real wage response to local unemployment, contrarily to what one would expect given the previous evidence of wage rigidity.

The methodology that they adopt is of interest in its own right. It is a fully non-parametric analysis that examines the whole distribution of wage changes. However, as true in an any econometric analysis, there are some identifying assumptions that we list now:

H 1: in the absence of rigidities, the distribution would be symmetric

H 2: the upper-half of the distribution is unaffected by rigidities

H 3: wage rigidities do not affect employment (an assumption that can be slightly relaxed).

Indeed, there is nothing here that tells us anything about the magnitude of measurement errors. Hence, they adopt the same information and approach that was used by David Card in his *Econometrica* paper (Card, 1996). They use the 1977 CPS that collected information both from the worker side and from the employer side on the same issues, such as wage, seniority,...

From the resulting counterfactual wage change distribution (see Figures 4a to 4c and compare with Figure 5), they are able to identify the effects of nominal wage rigidity. These effects are measured both in terms of number of persons affected by wage rigidity and in terms of wage changes (i.e. that, in absence of rigidity, would have been different). They find that:

1. The number of persons affected by such nominal wage rigidity amounts to 8 to 12% in the mid-80s

2. The effects of such nominal wage rigidity on wage changes are such that wage changes have been 1% higher every year than they would have been in absence of wage rigidity under the same time period of the mid-80s.

To summarize, they present, as usual with David Card, a very well-written and well-executed paper with simple and clear results.

Joe Altonji and Paul Devereux, in a recent NBER working paper (Altonji and Devereux, 1999), take a completely different approach in that they adopt a fully parametric specification of the wage change process. In particular, they use a well-specified statistical model of nominal wage rigidity together with a measurement error model. We describe the estimated equations later. Using the same structure as for the other papers, we must note that their data source is the PSID for the period starting in 1971 and ending in 1992. As other researchers, they concentrate on non-job changers paid by the hour. Hence, their measure of wage is the hourly wage.

To summarize the results that they obtain, we can say that:

1. Comparing the PSID with the personnel file of a large firm, they note that their are more nominal wage cuts in the PSID than in the large firm file

2. But, controlling for measurement errors, they find evidence of substantial downward nominal wage rigidity

3. They even conclude based on the likelihood of their various estimated models that perfect wage rigidity is a better approximation than perfect flexibility in terms of statistical fit

4. However, explaining wage changes remains extremely difficult (indeed a statistical measure of a simple wage change equation yields an R-square of approximately 0.05)

5. If they examine the impact of wage rigidity on employment stability, it appears that workers are slightly less likely to quit if they are protected by nominal wage floors

6. Finally, and unfortunately, some conclusions depend highly on the exact estimated model. In particular, because of the estimated structure of the model, the identification power is very weak and relies mainly on the normality assumptions. Strong evidence of the lack of identification is given.

As already mentioned, their methodology is fully parametric and is based on a statistical micro-model of wage changes that is consistent with the theoretical micro-model of McLeod and Malcomson (1993).

The first equation gives the optimal wage that would prevail in absence of rigidity:

$$w_{it}^* = x_{it}\boldsymbol{b} + \boldsymbol{e}_{it}$$

If there is wage rigidity, the equations become:

$$\Delta w_{it}^0 = x_{it}\boldsymbol{b} - w_{it-1}^0 + \boldsymbol{e}_{it} \qquad \text{if } 0 \leq x_{it}\boldsymbol{b} + \boldsymbol{e}_{it} - w_{it-1}^0$$
$$\Delta w_{it}^0 = 0 \qquad \qquad \text{if } -\boldsymbol{a} \leq x_{it}\boldsymbol{b} + \boldsymbol{e}_{it} - w_{it-1}^0 \leq 0$$
$$\Delta w_{it}^0 = \boldsymbol{1} + x_{it}\boldsymbol{b} - w_{it-1}^0 + \boldsymbol{e}_{it} \text{ if } x_{it}\boldsymbol{b} + \boldsymbol{e}_{it} - w_{it-1}^0 \leq -\boldsymbol{a}$$

where   and   represent rigidity parameters that should be both equal to zero in case of perfect flexibility, and where the shocks, $\boldsymbol{e}_{it}$, are normally i.i.d. error terms. In addition, Altonji and Devereux

specify a model of measurement error which is a mixture of a model with no error and a normal measurement error.

To conclude, it appears that the authors have a very promising statistical model that should be well-suited to the analysis of this question of wage rigidity. But, they obviously need better data, for instance data on workers and on their firms, to help them identify the effects of interest.

The final paper in this group of studies is unique in, at least, two aspects. First, Erica Groshen and Mark Schweitzer use an employer data source. More precisely, they analyze the Community Salary Survey that spans a very long period of time, from 1956 to 1996. This survey gives the wage distribution for each detailed occupation (mostly white-collar) for a group of employers of three American cities, Cleveland, Cincinnati, Pittsburgh. Hence, the data match employer information with job information. The measure they use is the median (or mean) wage in the occupation-employer cell. Second, their theoretical model consists in a two-stage process of the wage setting. This model helps them identify their estimated effects. More precisely, they assume that firms, based on their inflation expectations, first set the global change in the wage bill, and then, allot the change across occupations (think for instance of a central management that would set the general wage change rules giving the various profit centers the power to distribute the raises, freezes or decreases within their profit center to the job holders). Therefore, mistakes being more likely when inflation is large, it is possible to examine the dispersion of employers' wage adjustments across firms at different moments. If this dispersion is growing when inflation rises (controlling for the firm-level changes in the occupation mix), the authors conclude that

inflation has "sand effects". By contrast, inflation may have beneficial effects in the second stage of the wage setting process, in a context where nominal wages are downwardly rigid. For instance, it helps decrease the real wage of employees in declining occupations. More generally, the authors conclude that inflation should help the firm in following market conditions for some occupations without firing workers. In fact, this "grease effect" should be uncovered in the data by examining the dispersion of within-firm between occupations adjustments. This dispersion should be larger in years of higher inflation. Conversely, rigidity should imply a reduced variance.

Their empirical analysis relies on an analysis of variance in which wage changes are regressed on firm and occupation indicators. This analysis is performed for each year and for each locality. Then, they take the coefficients on the firm and on the occupation indicators to measure dispersions between firms as well as between occupations in each year and locality. These measures are then regressed on inflation measures for the same years and localities.

Their results are in agreement with the above model. Using wage changes for the various establishment-occupation cells in the Community Salary Survey, Groshen and Schweitzer find evidence in their data that, indeed:

1. Inflation-induced occupational adjustments represent beneficial grease (inflation expectations)
2. Inflation-induced wage changes across employers reflect distortionary sand (surprises in inflation expectations).

As already mentioned, their methodology is based on this two-stage wage determination process with errors in wage setting due to inflation and downward rigid nominal wages in which the first stage yields the average nominal adjustment and in which the second stage yields the division of the raise among workers.

To conclude, I believe that the authors have taken two important steps in a very interesting direction but the descriptive tools and estimation techniques may still be improved.

4 Lessons from a Recent American Interview Study

Using a completely different approach, Truman Bewley (Bewley, 1998 as well as his forthcoming book) can help us understand the rigid wages problem from a different and complementary perspective.

The data source, if it is possible to use this term, has been constructed by Bewley himself. He conducted interviews of 300 business people, labor leaders, consultants during the recession of the early 1990s. The basic question that was asked is reflected in the title of Bewley (1998) – Why not cut pay ?

As done for all other studies, I will summarize the most important results of this line of research:

1. According to managers, pay cuts would have no impact on company employment

2. Hiring new workers at reduced pay (or overqualified) would antagonize them

3. Cutting the pay of existing workers is nearly unthinkable (attitudes)

4. Layoffs are better than pay cuts: they "get the misery out of the door"

5. Attitudes have an impact on performance

6. Contrarily to a widespread belief, the main resistance to wage cuts comes from employers (loss of morale) and not from union leaders

7. After examining all theories of wage rigidity, it appears that there must be only one valid micro-theory. It is a theory that states that morale is incompatible with wage cuts (note that it is not a theory about levels like in Akerlof's norms theory but a theory about wage changes).

To conclude, I find Bewley's analysis quite interesting because he takes seriously both the collected interviews and theoretical work. Hence, his confrontation of collected data to various theories is of prime interest. In addition, he makes a lot empirical suggestions at the end of the book that any applied labor economist should look at. However, if we are not willing to buy the morale explanation of nominal wage rigidity but if we buy his other conclusions, we must look for non-existing theories of nominal rigidity.

5 Lessons from Recent European Microeconometric Studies

Recently, European scholars have started to examine the existence of wage rigidity using individual data inspiring themselves from the earlier American analyses. The first such study was based on French data and appeared in 1997, the year of publication of the Kahn and Card and Hyslop papers.

Dominique Goux has examined the case of France using two complementary data sources. The first one is called the Déclarations Annuelles de Données Sociales (DADS, hereafter), an adminsitrative data

source based on companies' fiscal declarations. The second data source is the French Labor Force Survey (LFS, hereafter). The periods under study are respectively 1976 to 1992 for the former and 1990 to 1996 for the latter. As in their American equivalent, the study focuses on non-job changers working full-time. However, due to the structure of available the data, Goux (1997) uses annual earnings as a measure of wages. Hence, hours are not controlled for.

The results are sumarized as follows:

1. Even though the DADS which are administrative data have wages of excellent quality, the amount of wage cuts in the DADS is similar to the numer of wage cuts observed in the LFS. Approximately 25% of the workers (non-job changers employed full-time) experience nominal wage cuts between 1991 and 1992

2. As observed in the US, the frequency of wage cuts is negatively related to inflation

3. Among full-time workers with pay cuts and without firm change:

   - 34% have better working conditions (no more night,… work)

   - 22% face a decrease in their annual bonus

   - 30% change 4-digit occupation

   - More than 60% are in one, at least, of these three situations.

Hence, what Goux (1997) shows is different from what was learnt from other studies: there are not as many measurement errors as usually thought in LFS type data; better information on the job explains away many of the nominal wage cuts.

Three recent papers, all written in 1999, address the same questions for Italy, Switzerland and the UK. We will review them in order.

Dessy studies the situation of Italy using a data source coming from the Bank of Italy, the Bank of Italy panel data set for the period 1989 to 1995. Dessy studies both stayers and movers using as a wage measure the net income from employment.

The results are the following:

1. Confirming widespread prejudices on Italy, there is indeed more rigidity than in most other countries
2. However, it appears that stayers and movers are similarly affected by nominal rigidity.

Fehr and Goette study the situation prevailing in Switzerland. Their data source is the Swiss LFS for the period going from 1991 to 1996. They analyze earnings per working hour of non-job changers. Their methodology rests on the estimation of an econometric model in the spirit of Altonji-Devereux's.

The results are:

1. In periods of very low inflation, there are 12% of rigid wages and 25% of cuts
2. From the estimated model, 1/3 of what should be wage cuts turn into wage freezes for stayers and 15% for movers, because of wage rigidity

3. Full-time workers receive more often a pay freeze than part-timers.

The final study of the rigidity of nominal wages is due to Smith for the UK. The data source that is used is the British Household Panel Study (BHPS) for the period 1991 to 1996. The earnings per week of non-job changers is the analyzed measure of wage. An interesting feature of the BHPS is the following. When the reported earnings have been compared with the payslip, the BHPS reports that this check has been performed. Hence, Smith can compare wage changes for workers with checked earnings with those of workers with unchecked earnings.

The results are summarized now:

1. There is a substantial amount of wage cuts and freezes: 22% of pay cuts and 9% of rigid wages

2. After accounting for rounding, measurement error, and long-term contracts, 1% of the workers have rigid pay

3. Contrarily to what is asserted by most analyses, measurement error increases apparent rigidity since workers have an inflexible idea of their pay (this is shown using the BHPS reports when the pay has been checked with the payslip).

All these European studies point to very interesting results, often counter-intuitive given the American ones, that seem to show that either there is at least as much rigidity (or flexibility) in Europe than in the US (bar Italy who appears to be Italy) or American studies overestimate the importance of measurement errors.

6 Implications for Employment

In a recent paper, David Card, Francis Kramarz, and Thomas Lemieux analyze the implications of wage rigidity on employment in three countries, Canada, France, and the United States (Krueger and Pischke examine a similar question by comparing Germany and the US).

More precisely, they try to answer the following simple question. Can we explain the dichotomy between the US, where real wages of unskilled workers fell and aggregate employment increased, and Continental Europe, where real wages of unskilled workers were constant and employment stagnant, by responses to common adverse demand shocks in an environment where wages are flexible versus an environment with high minimum wages and strong unions where wages are rigid ? Is there evidence of this tradeoff hypothesis? This hypothesis, formulated by Krugman, therefore states that increasing inequality in the U.S. and increasing unemployment in Europe are the two faces of the same coin.

It is quite easy to summarize the results since they amount to a clear and negative answer to the above question. The tradeoff hypothesis does not hold when confronted to data. The same answer is also found in Krueger and Pischke for the U.S. versus Germany.

In all three countries, Card, Kramarz, and Lemieux (1999) use similar data sources, LFS for all, under the same sample period, the eighties. Since the result is important, it is crucial to detail the methodology. We specify the various steps that lead to the result:

1. The authors show that the 3 countries faced the same shocks (technological; i.e. computers, andtrade)

2. They construct sex-age-education cells at the beginning and at the end of the eighties. The crucial variables are employment ratio and wage for each cell

3. They construct for each cell a measure of the shocks (one is the wage at the beginning of the eighties, the second is the percentage of computer users in the cell at the end of the eighties)

4. They show that relative wages changed in the US in favor of the high-skilled

5. They show that relative wages did not change in France over the period

6. They show that Canada is in between

7. They then look at the changes in the relative employment ratios across cells in the US

8. They compare with those observed for France and for Canada

9. The tradeoff hypothesis should imply that the shocks should have affected the relative employment ratios of the less-skilled in France much more than in the U.S. since wage rigidity prevented the necessary adjustments

10. The estimation results show that the changes in the relative employment ratios are similar across countries.

The conclusion should now be obvious. Krugman's tradeoff hypothesis, in its simplest version at least, is rejected by the data.

7 Firms ' Behavior

The previous result may seem surprising. How can we reconcile all the facts that we know on the United-States, France and other countries? I tend to believe that the understanding of firms' behavior is necessary at this point. A first attempt to show how French firms gain flexibility in a rigid world has been made by John Abowd, Patrick Corbel, and Francis Kramarz. By using data on flows of workers (not stocks) with information on the type of contract, the skill, the age and the seniority of the exiting workers for a sample of French establishments followed over a period of four years (1987 to 1990) based on the Déclarations de Mouvement de Main d'Oeuvre (DMMO), Abowd, Corbel, and Kramarz (1999) show the following result:

In France, when an establishment is changing employment, the adjustment is made primarily by reducing entry and not by changing the separation rates, except when establishments have to separate from a large fraction of their workforce, like 15 or 20% (see the left part of Figure 6). This result is robust to various controls and, in particular, to the introduction of establishment fixed-effects in all regressions.

From this result, we may conclude that, in a country that appears to have institutional rigidities, there are ways to circumvent wage rigidities and high firing costs. In particular, there is one institutional flexibility, the existence of short-term contracts, that helps firms in accomodating shocks, selecting workers, …

Even without changing their employment, firms are in position of making potential turnover savings, for instance by hiring less senior workers after a quit. Indeed, firms can control their total labor costs. This what John Abowd, Francis Kramarz, and Sébastien Roux have started to study. More precisely, they want to understand how firms make turnover savings and manage their wage bill.

To accomplish this task, they rely on a newly available matched employee-employer administrative and exhaustive dataset on wages, hours,... for the French private sector (there are more than 1 million observations when we study only one of the 22 French regions). Workers are followed from year to year (here 1996 to 1997). The available variables are total earnings, total hours, total days for each worker in each establishment of the region. Using these variables they are able to decompose the changes in the total wage bill into those due to changes of workers present in both years (stayers), changes due to entering workers (entrants), and changes due to workers leaving the establishment (exiters).

To summarize their preliminary results, we see that:

1. The total wage bill moves as that of entrants and exiters not as that of stayers

2. Year to year changes in the wage bill are 8.3% of the average wage bill

3. Wage bill creation rate (defined similarly to what Davis and Haltiwanger, 1992, do for the job

   creation rate as $\dfrac{(e_{t+1} - e_t)}{\dfrac{e_t + e_{t+1}}{2}}$ - where e denotes employment - when this rate is positive) is 16.7%

   (with 11.6% for entrants and exiters, and 5.0% for stayers)

4. Wage bill destruction rate (defined similarly to what Davis and Haltiwanger, 1992, do for the job

   destruction rate, when the above rate is negative) is 47.1% (with 39.7% for entrants and exiters, and

   7.4% for stayers)

5. Among stayers, wage bill destruction hits the highly-skilled

6. Among entrants and exiters, wage bill destruction also hits the highly-skilled

7. The last two statements are also true for wage bill creation.

Hence, once more, in the face of strong wage rigidities, a firm may use various means to control its wage bill when hit by positive or negative economic shocks. Of course, this is only a start. But using this kind of data is obviously the way of the future for analyzing firms' simultaneous control of wages, hours, and employment.

8 Conclusion: Understanding Wage Changes

First, let me summarize the main conclusions from this survey of the recent studies of wage rigidity.

1. The timing of the analysis is essential to identify most of the effects, since the level of inflation is obviously very important. In fact, it may be the most convincing piece of evidence showing the existence of nominal rigidities: wage change distributions in years of high inflation strongly differ from those observed in years of low inflation (see Kahn or Card and Hyslop for individual data and Groshen and Schweizer for establishement data). In addition, human-resource managers claim that they dislike to cut wages (Bewley)

2. Labor market institutions obviously matter. They explain the formidable amount of rigidity observed in Italy. In other parts of Europe, flexibility is achieved through other means than wage cuts (Goux, Abowd, Kramarz, Roux). This may also help explain the differences between Europe and the U.S. where rigidity seems less pervasive. To uncover the precise mechanisms by which firms achieve their

goals, it appears crucial to obtain data both on the job (like schedules, a precise occupation,…) and on the employing firm

3. Because of the above problems of time period or institutions, the evidence of wage rigidities may appear to be mixed: not all measures, not all data sets, not all types of employees indicate such rigidity, either nominal or real. In fact, even though the difference between real and nominal rigidity is important for theorists, it may matter much less in periods of low inflation for firm policies

4. The evidence on measurement errors is also mixed: some authors claim that their data are clean whereas others do not. In addition, some authors view measurement error as leading to understating wage rigidity (it adds an error term to an otherwise inflexible wage, Card and Hyslop or Altonji and Devereux) whereas others claim that it may lead to overstate wage rigidity (because workers declare the same wage two years in a row, even when their wage has changed, Smith)

5. The data source seems to matter, in particular in the U.S., for instance when comparing results based on the PSID with those based on the CPS, since the sampling frame and the information available in the various sources make comparisons difficult. On the other hand, in France, the only European country for which such a comparison is available, survey data and administrative data display the same amount of rigidity or flexibility. Remember also that data on individuals, from labor force surveys for instance, paint a different picture than that obtained using data from firms (the focus is different: no problem of measurement error, more information on the job or the occupation, less information on other environmental or social outcomes)

6. There are obvious differences between categories of workers. Rigidity widely differs for workers paid by the hour and for salaried workers in the U.S.. The first face less pay cuts (Kahn). Also,

rigidity widely differs for blue-collar workers and for white-collar workers in the U.S.. The first also

face less pay cuts (Kahn). However, the minimum wage may play a role (Card and Hyslop)

7. The insight that one obtains depends on the technique that is used. More precisely, non-parametric

evidence is complementary to more structural approaches, estimated by maximum likelihood

techniques.

Unfortunately, there is very little that helps explain wage changes both theoretically and empirically. The

explanatory power of classical variables is almost zero in any regression, even though we know how to

explain wage levels (see for instance, Abowd, Kramarz, and Margolis, 1999).

8. Indeed, new insights on the extent of rigidity and on its impact on employment will come from better

data sources, more specifically matched employer-employee longitudinal data sets. In particular,

such sources may help understand the within-firm composition effects that are described for the U.S.

by Groshen and Schweitzer and by Abowd, Corbel, Kramarz or Abowd, Kramarz and Roux for

France. At this stage, I do believe that they are crucial to fully assess the magnitude of rigidity that, in

reality, affects the firms. I tend to believe that in periods of low inflation, there are multiple ways of

"managing the wage bill" other than cutting pay.

After this little guided tour of recent empirical studies on nominal or real wage rigidity, could we draw

conclusions that would be helpful to economic theory? I believe that evidence of wage rigidity exists, or

to be more specific, firms appear to prefer to cut employment rather than cut wages in a downturn. This

is really what economic theory has to explain. This is all the more crucial that, as already mentioned,

microeconometricians are unable to explain individual wage changes. In fact, almost all studies that we

have presented have adopted statistical models rather than more structural models inspired from theory.

Indeed, theory seems to have little to say about the respective role of firm-specific policies versus person-specific explanations of wage changes that appears to be empirically relevant.

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L_2: $Y(w/p) - C(R(Y(w/p)), p, w) = G$

L_3: $Y^* - C(R(Y^*), p, w) = G$
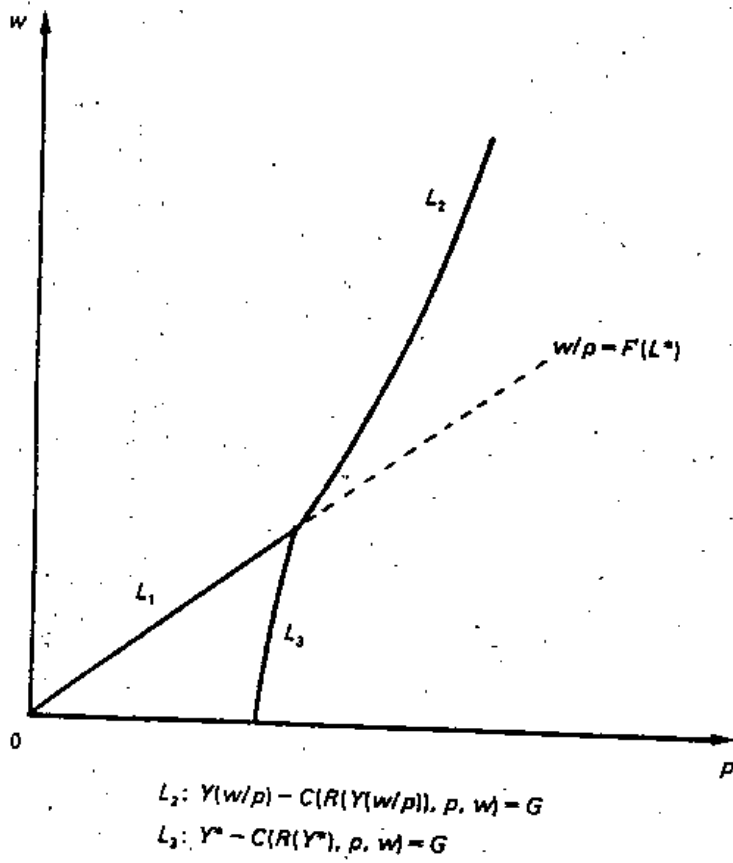
Figure 1

(from Grandmont, 1989)
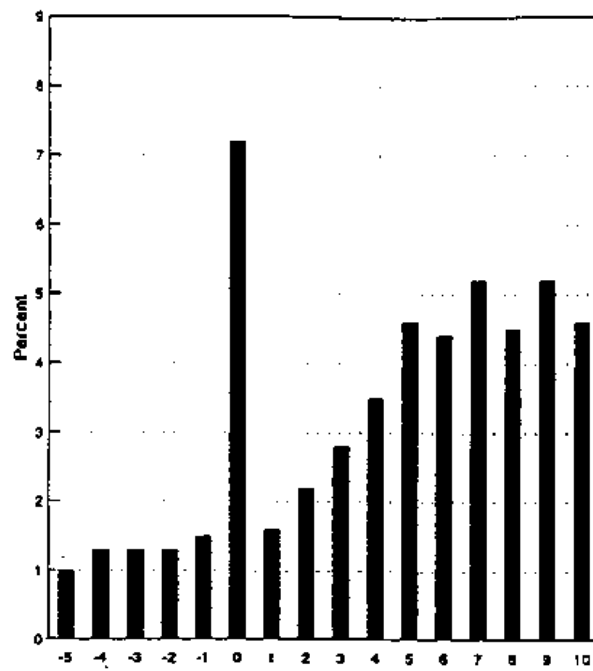
Figure 2 : Nominal wage growth distribution, stayers, annual difference of log wages, PSID 76-86

(from McLaughlin, 1994)

Relative frequency
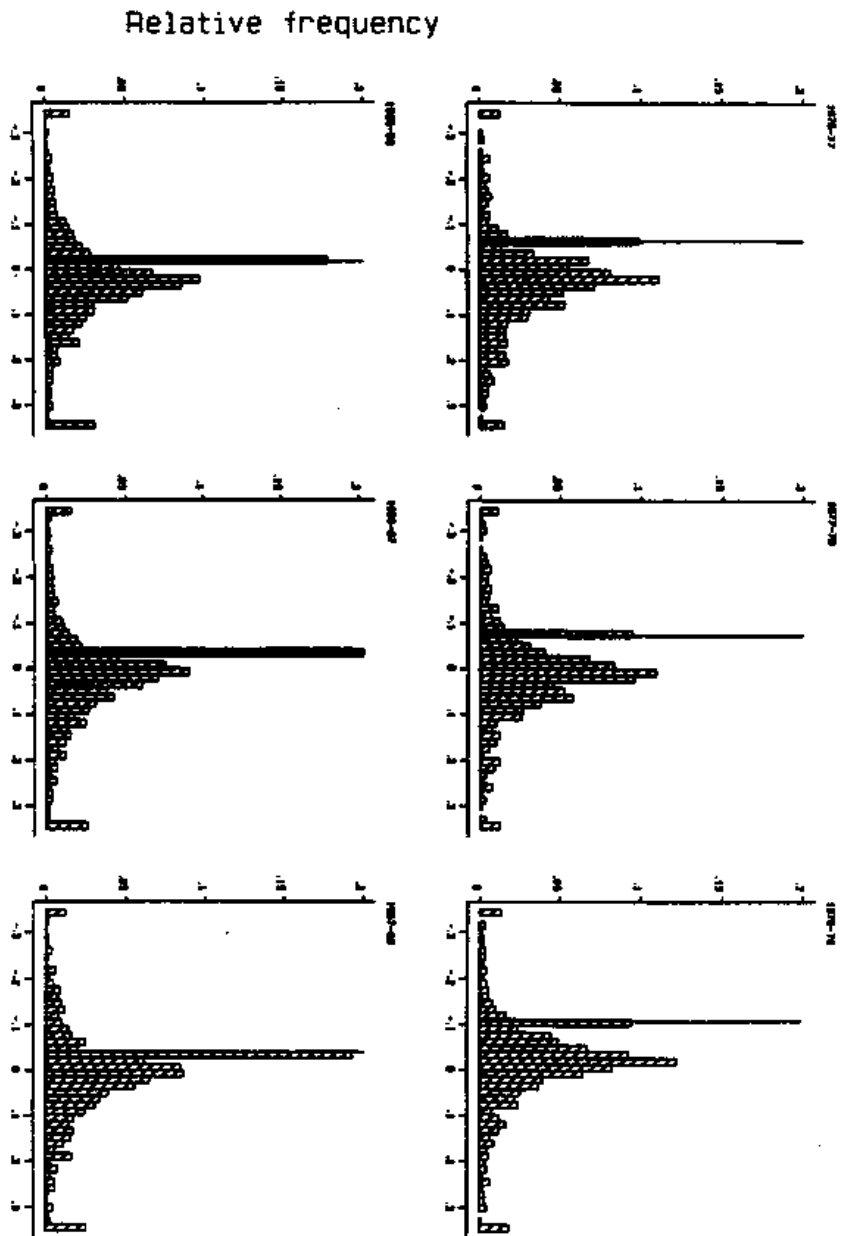
Figure 3 : Distribution of annual differences in log real wages, hourly-rated stayers, PSID

(from Card and Hyslop, 1997)

Density

Real wage changes

-.3   -.2   -.1   0   .1   .2   .3

0

2

4

6

8

· r_dens   · ac_dens

Figure 4b : Theoretical illustration of the effect of downward nominal rigidity and menu costs on the distribution of real wage changes
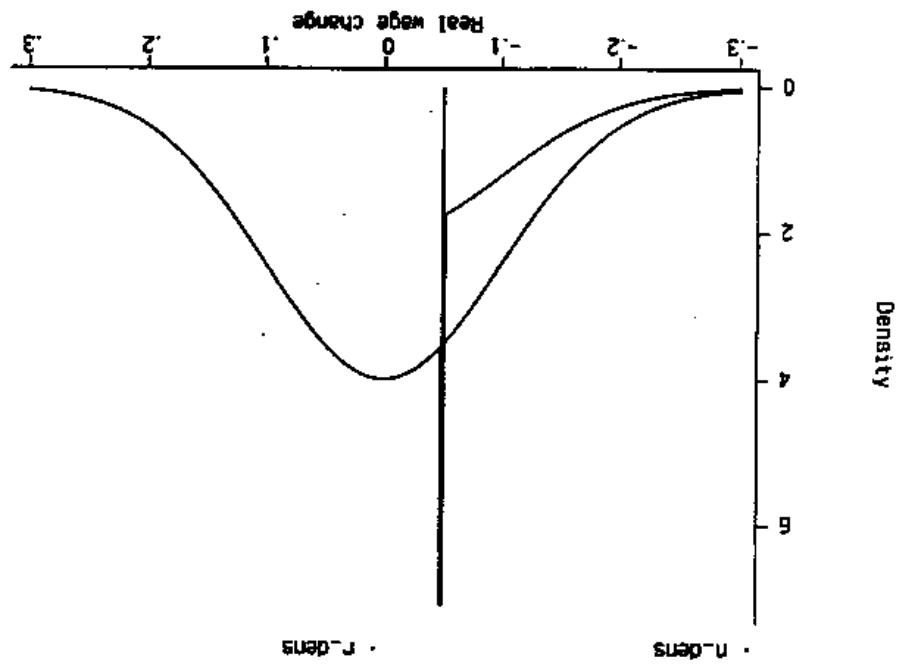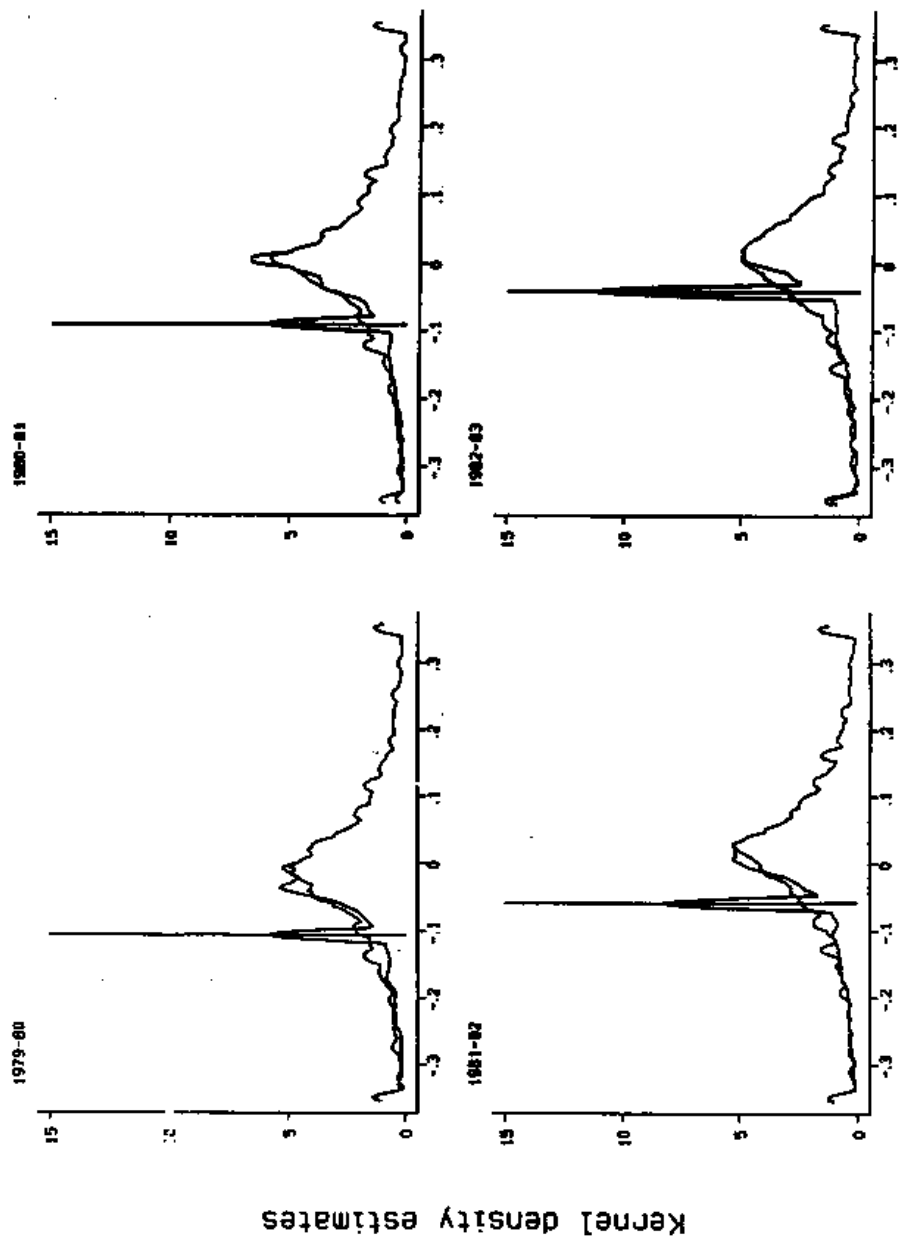
(from Card and Hyslop, 1997)
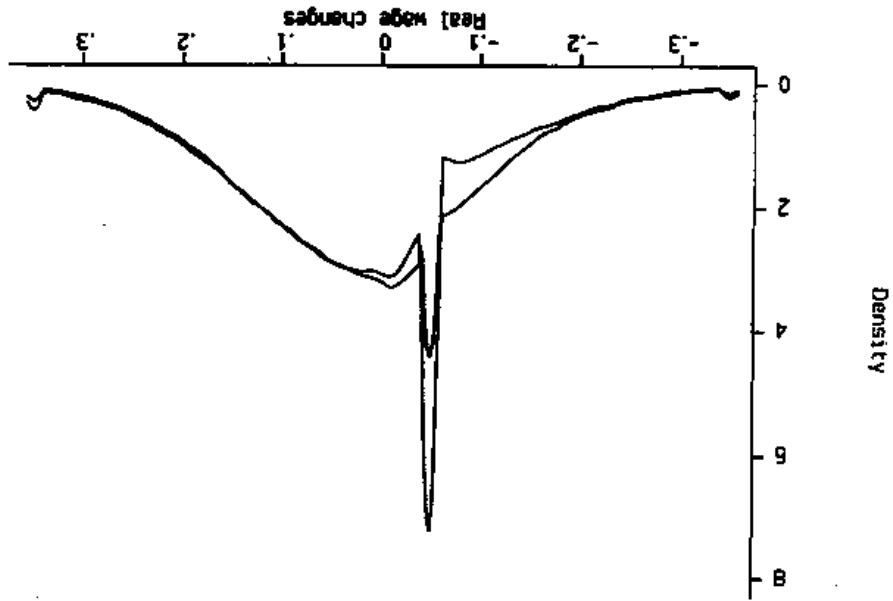
Figure 5 : Kernel estimates of actual and counterfactual densities of real wage changes,

stayers, CPS, 79-80 to 82-83

(from Card and Hyslop, 1997)

Figure 6 : Entry and exit rates by establishment growth

(controlling for establishment and year effects)

(from Abowd, Corbel, Kramarz, 1999)