

50 Years of Job Vacancies in
Colombia: The Case of Bogota,
1960-2010

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50 Years of Job Vacancies in Colombia: The Case of Bogota, 1960-2010*

Andrés Álvarez¹ and Marc Hofstetter²

Abstract

This paper presents a novel monthly dataset of job vacancies in Bogota between 1960 and 2010. The dataset was constructed by counting the number of help-wanted announcements published in the most important newspaper with national circulation – namely, *El Tiempo*. We describe the methodology used to construct the database, discuss some possible problems associated with it, and propose ways to solve them. The paper also presents an estimation of the job vacancy *rate*. We depict a Beveridge curve and use the vacancy rate to forecast unemployment. This first look at the series yields sensible results, while leaving a myriad of open questions for future research.

Keywords: Vacancy Rate, Unemployment, Beveridge curve, labor market, Colombia.

JEL codes: E24, E32, J63, J64.

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1. Introduction

The Royal Swedish Academy of Sciences noted when announcing the 2010 economics Nobel Prize winners that “[t]he laureates’ models help us understand the ways in which unemployment, job vacancies and wages are affected by regulation and economic policy.”

In spite of the topic’s relevance, what we know about it is either mainly theoretical or largely based on evidence using data from advanced economies. The reason for this is that we do not have long time-series of vacancy rates in developing countries. In fact, for most developing countries, even short time-series of vacancy rates are unavailable. As discussed in section 2, in Latin America, only a couple of countries, Chile³ and Peru⁴, have short time-series of vacancies; these are constructed in a manner similar to ours—that is, using help-wanted announcements. This paper intends to fill part of the gap by proposing a fifty-year long monthly series of vacancies for Colombia. To the best of our knowledge, this is the first long-run job vacancy series for the developing world.

Why are vacancy rates’ statistics important? Vacancies summarize businesses’ hiring plans and represent signals for future labor demand trends. As such, they are useful for addressing a number of relevant questions related to labor markets and economic activity.

Vacancies are also useful for studying the matching process of the labor market as well as the nature of shocks affecting it (Blanchard and Diamond, 1989). They are pivotal for gaining a better understanding of the movements of Phillips curves, as well as for obtaining more accurate estimates of the NAIRU and a more precise explanation of unemployment fluctuations (Blanchard and Diamond, 1989; Dickens, 2009; and Barnichon, 2009). They also constitute an important input for assessing the relevance of sectoral shifts and changes in the

³ Belani et al., 2002; and Cobb and Sánchez, 2008.

⁴ Cosvalente, 2010.

demographic composition of the labor force in determining labor market fluctuations and trends (Abraham, 1987).

Vacancies, reported as a percentage of unemployment, have also been used to assess the tightness of labor markets. A better assessment of the role of labor market institutions in determining labor market outcomes has also been boosted thanks to vacancy datasets (Nickel et al., 2001). Finally, the many papers that extend and apply to the data the Mortensen, Pissarides and Diamond (MPD) Nobel Prize winning family of models need data related to vacancies.

In this paper we propose a fifty-year long monthly proxy for vacancies rate for Colombia for the period 1960-2010. We do this by counting “help wanted” (HW) advertisements in the country’s main newspaper, *El Tiempo*. In this sense, our index resembles the HW index for the U.S. summarized in Abraham (1987) and Zagorsky (1998) among others, one widely used in academic and policy circles as a proxy for vacancy rates.

A number of issues arise when using such an index as a proxy for vacancy rates. For instance, is one newspaper enough to proxy for vacancies countrywide or even within a local economy? Could changes in the media industry over time bias the index, by diminishing or heightening the likelihood of newspapers being used as an outlet for posting vacancies? How to take into account the fact that more recently, HW advertisement has accessed online platforms? What impact do changes in the relative importance of certain sectors in the economy have over time, given that different sectors exhibit different probabilities of using print HW advertisements to fill vacancies? And so forth. In this paper, we discuss these issues, and propose certain corrections to the raw series where needed, provided of course that the relevant information and data are available for doing so.

A more extensive interpretation of the resulting series and some of its applications to the analysis of Colombia’s labor market are addressed in a

separate paper (Álvarez and Hofstetter, 2012). Here, we focus our attention on the process of the dataset's construction, and show that it yields sensible results. For instance, some well-known episodes of economic downturn—the so-called debt crisis of the early-80s, and the financial crisis of the late-90s—coincide with sharp decreases in the vacancy rate; the opposite has happened during periods of economic boom—for example, during the mid-90s.

The rest of the paper is organized as follows. Section 2 briefly describes several vacancy datasets available in Latin America and certain industrialized countries. Section 3 explains how we built the HW dataset, while section 4 describes and characterizes the main features of our vacancy rate. Section 5 examines problems that could cast doubt on the accuracy and usefulness of the proposed vacancy rate. We discuss each in turn and propose corrections to address some of these concerns. In section 6, we briefly show how the dataset yields interesting and coherent patterns. Section 7 concludes.

2. Other vacancies datasets

Datasets of job vacancies are almost exclusively available for developed economies. Many of them are based on official series, while others, generally constructed for research purposes, are based on proxies such as HW advertisements. The former are often relatively recent series (for instance, the series for the U.S., which is based on the Job Openings and Labor Turnover Survey [JOLTS], are roughly a decade old), while the latter may cover a much longer period (for instance, in the U.S., the Help Wanted series go back as far as the 1920s). In developing countries, however, vacancy series are scarce. In most cases, those countries lack both official vacancies statistics as well as historical datasets constructed for research purposes.⁵ In what follows, we briefly discuss

⁵ Recently, several Latin-American countries developed public services that gather job offers in an attempt to reduce matching frictions in labor markets. In Mexico and Brazil, for example, the Ministries of Employment offer online Help Wanted posting systems for free. Intuitively, it might seem that the postings by these services could be considered as a proxy for vacancies.

some examples of job vacancy datasets available for developed and developing countries.

Developed Countries

Eurostat publishes vacancies datasets for the Eurozone countries. The methods used to gather and consolidate the information are heterogeneous across countries. Most continental Western European countries gather these statistics using the information reported by public or private employment offices. The existence of public unemployment insurance systems allows for the centralization of such information. Other countries—for example, the Netherlands—report data on vacancies based on surveys of a sample of firms. Other non-European developed countries, like Singapore, Hong Kong and Australia, employ similar methods. In the US, the Bureau of Labor Statistics (BLS) uses a recently created tool for measuring job turnover and vacancies—the JOLTS. The survey is applied to a sample of firms on a voluntary basis. In spite of these systematic efforts, the official OECD statistics only present figures for unfilled vacancies and vacancies rates since 2009.

Developing Countries

In developing economies, official statistics for job vacancies' are scarce. In Latin America in particular, as far as we know, there is not a single country producing official job vacancy series. There are only a couple of unofficial- and short series based on help-wanted advertisements put together by researches in Chile and Peru.

Belani et al., (2002) propose a Chilean historical job vacancies dataset based on newspapers' help-wanted advertisements using a representative sample of the main regional newspapers. While their series is not as long as ours (1986-2002), it is quite detailed in that they take into account vacancies across different industries. Moreover, contrary to the tradition established by the HW series in the U.S., they count the number of job offers within each advertisement. Cobb

However, they are not a good proxy for several reasons. Most significantly, if the government puts more effort into collecting job offers, the series will show a (spurious) increase in vacancies.

and Sánchez (2008) extend the series, but consider the number of advertisements rather than the number of open positions per announcement. This practice is analogous to the newspaper-based HW index used in the U.S. It avoids strong variations caused by some advertisements containing potentially hundreds of open job positions while most contain only one position or simply do not specify the actual number. In this way, Cobb and Sánchez produce a smoother historical dataset for the period 1995-2007, one more appropriate for econometric analysis.

Cosavalente (2010) features another relevant effort to build job vacancies series in Latin-America, this time in Peru. His work follows the same method as used by Cobb and Sánchez in their paper—namely, they consider the number of advertisements instead of the total number of job positions within the advertisements. The paper gathers information for a particular region in Peru using only the main newspaper of the region’s capital city. This is similar to our strategy, although our series may better capture the countrywide behavior of the labor market, because it gathers information for Bogota, the largest labor market in the country.

While Colombia has no official vacancy datasets, a recent legislative act concerning “first employment” promotion⁶ contains a chapter prescribing the creation of a national committee to be in charge of collecting and publishing “information on labor demand.” This should eventually lead to the construction of an official nationwide statistical instrument for gathering data on job vacancies. Our historical dataset could eventually be merged (as Barnichon, 2010, did with the U.S. data—see below for details) with future official vacancy rates, thus producing a long historical vacancies series.

⁶ Act No. 1429, issued December 29, 2010.

3. How we collected our data

As already mentioned, we construct our vacancies series by counting help-wanted advertisements published in the print version of Colombia's principal national newspaper, *El Tiempo* (henceforth, *ET*). According to the 2010 EGM,⁷ on weekdays, the printed version of *ET* was read daily by over 1.1 million people. The second most important newspaper, *El Espectador*, had roughly a quarter of that readership—that is, 310,387 readers. This proportion is very similar to the one reported in the late-90s, when the EGM surveys started.⁸

The task of collecting the information on HW advertisements is indeed daunting. It involves literally counting advertisements by searching through the historical archives of the printed versions of the newspaper. The task actually goes beyond simply counting, as we found that not all advertisements published in the vacancies sections corresponded to actual vacant employment positions. Thus, we had to take a quick glance at each advertisement in order to make sure they actually corresponded to vacancy postings.

Given how overwhelming such a task is, especially since we wanted to cover a long historical period and collect data on a monthly frequency, we decided to count the advertisements published in only one issue per month. Put another way, we did not count advertisements on a daily basis, as was done for many years by Conference Board building the HW index of the U.S.

Two questions arose: which issue of the week and what week of the month should be used to count advertisements? To decide this, we first checked all of the issues within a particular week across different decades to see if there was a particular pattern in terms of which day of the week was preferred for publishing HW advertisements. Our records suggested that Fridays consistently appeared to be the day of the week with the most advertisements.

⁷ EGM: *Encuesta General de Medios*, Colombia's countrywide media industry survey. It includes newspapers, internet traffic, television and radio.

⁸Unfortunately, there is no independent agency in Colombia that records the number of printed issues sold by each newspaper over time. The EGM surveys started in 1999.

We thus decided to count the HW advertisements published the third Friday of each month. We chose the third Friday because it minimized the chances of hitting standard official holydays (for instance, Christmas, January the 1st, Columbus day (October the 12th), Immaculate Conception (December the 8th), etc.). In the event that for a certain year the third Friday happened to fall on a holyday (for instance, in some years, it might coincide with Catholic Holy Friday, a national Holyday in Colombia), we recorded the advertisements appearing the previous Friday.

While the vacancies posted cover a vast array of jobs, they typically corresponded to such occupations as driver, carpenter, construction worker, deliveryman, salesperson, baker, operator, electrician and plumber, among others. In some cases, we spotted advertisements announcing multiple jobs. In such cases, we counted the advertisement as corresponding to one vacancy, following the line of reasoning discussed above with respect to related Chilean and U.S. datasets.

While *ET* is the main national newspaper, it is based in Bogota and the capital has traditionally been its main market. We verified that over the years, the vacancies posted in *ET* correspond mainly—as a matter of fact, almost exclusively—to jobs in Bogota. Thus, we interpret the series as a proxy of the vacancies in Bogota. Having said that, to the extent that Bogota is by far the largest city in the country—the 2005 Census shows that 16% of the population is concentrated in Bogota—and its main economic center—currently, over 25% of Colombia’s GDP is generated by that city—our series could be considered indicative of movements in vacancies at the national level. Future work should extend the series to capture vacancies published in some of the regional newspapers so as to obtain a more precise national measure of vacancies.

4. The help-wanted series and the vacancy rate

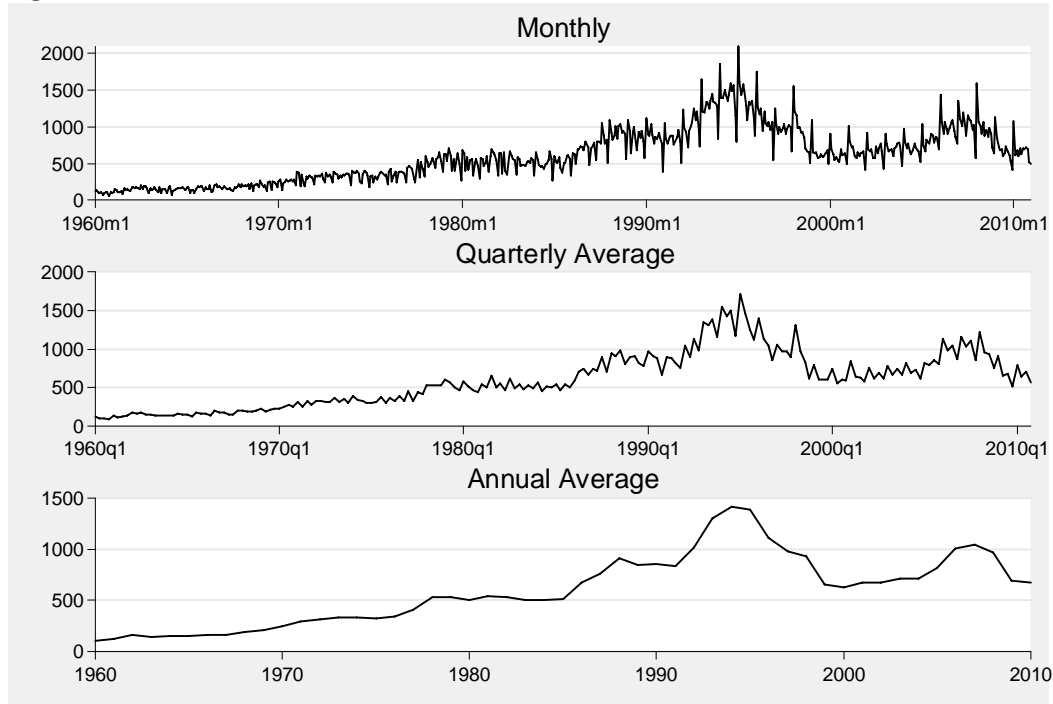
HW series

Following the strategies outlined above, we counted the vacancy postings for the period 1960-2010 at a monthly frequency. The raw data is reported in Table 1 and depicted in Figure 1.

Table 1
Number of HW Advertisements: 1960-2010.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1960	121	135	116	98	110	76	100	109	105	63	91	116	103,3
1961	116	149	138	116	107	127	79	162	135	156	126	142	129,4
1962	171	173	168	173	164	153	202	152	185	194	98	166	166,6
1963	169	142	151	179	141	109	175	96	147	150	103	152	142,8
1964	171	185	73	128	137	148	167	164	167	174	133	160	150,6
1965	181	179	99	133	136	94	157	191	170	187	127	186	153,3
1966	173	153	152	197	104	118	201	216	176	189	151	176	167,2
1967	184	173	151	157	161	141	118	180	167	196	177	212	168,1
1968	214	190	200	192	213	145	229	124	207	211	170	210	192,1
1969	274	221	183	202	130	241	259	139	257	249	182	227	213,7
1970	256	282	139	226	254	277	261	274	281	261	207	279	249,8
1971	391	381	185	344	231	187	321	296	342	312	217	310	293,1
1972	338	326	330	319	362	298	240	379	323	351	243	327	319,7
1973	384	368	344	292	331	309	348	331	364	359	199	347	331,3
1974	403	378	372	396	367	251	234	343	396	376	182	342	336,7
1975	326	337	238	326	288	328	376	391	364	334	216	344	322,3
1976	387	434	252	338	387	239	376	391	387	370	249	365	347,9
1977	439	472	454	425	294	248	450	553	313	516	316	428	409,0
1978	602	527	461	497	569	529	443	565	583	652	388	534	529,2
1979	624	630	539	705	600	404	563	398	560	635	268	501	535,6
1980	678	641	407	590	419	547	565	331	504	555	292	474	500,3
1981	570	562	474	510	600	391	607	687	654	626	330	550	546,8
1982	644	638	365	656	406	349	579	670	604	563	347	550	530,9
1983	584	559	471	477	488	462	526	539	503	578	337	553	506,4
1984	651	554	484	455	464	431	497	493	551	662	275	562	506,6
1985	600	515	502	593	441	370	512	511	607	616	338	568	514,4
1986	639	628	499	696	694	727	721	686	805	775	486	725	673,4
1987	709	742	781	547	794	802	769	1050	874	775	504	827	764,5
1988	1089	916	828	876	1009	836	1007	1034	918	952	561	902	910,7
1989	1088	942	646	937	996	792	676	934	855	952	572	806	849,7
1990	1116	898	879	1035	892	776	872	846	918	850	390	772	853,7
1991	1049	842	776	869	885	877	758	817	871	954	512	804	834,5
1992	1236	982	926	724	941	1008	1069	1249	1087	1214	731	993	1013,3
1993	1642	1209	1203	1348	1333	1254	1359	1443	1345	1328	837	1292	1299,4
1994	1864	1399	1391	1496	1432	1356	1433	1592	1490	1571	805	1152	1415,1
1995	2102	1616	1435	1586	1492	1290	1095	1341	1309	1352	882	1120	1385,0
1996	1754	1269	1173	1256	946	1212	1052	1012	1059	963	552	1060	1109,0
1997	1244	1037	908	1000	934	983	1039	910	970	1019	662	996	975,2
1998	1556	1214	1162	987	995	919	938	850	712	674	509	659	931,3
1999	1092	653	646	659	570	586	622	590	598	638	496	684	652,8
2000	910	690	627	549	584	530	518	690	608	631	499	645	623,4
2001	1006	801	716	739	605	570	659	607	637	655	415	667	673,1
2002	913	691	673	692	577	578	727	647	709	771	423	666	672,3
2003	912	772	663	676	700	605	710	737	767	781	467	740	710,8
2004	971	799	701	773	671	625	684	776	720	676	515	672	715,3
2005	1043	746	672	831	789	775	902	886	790	867	698	853	821,0
2006	1439	1064	910	1066	976	904	988	1062	1095	940	778	871	1007,8
2007	1362	1102	1018	1192	1024	885	1163	1090	1081	964	578	1019	1039,8
2008	1589	1069	1012	907	1067	884	957	867	984	904	643	722	967,1
2009	1136	858	725	683	694	598	639	736	671	619	409	533	691,8
2010	1085	608	683	605	707	626	710	694	715	695	496	524	679,0

Figure 1: Number of HW advertisements, 1960-2010



A seasonal pattern is apparent in the top panel in Figure 1. To verify this impression, we first report the average postings per month, in Figure 2. Here it seems clear that January is the month with the most postings, and December the month with the fewest. We then run a simple OLS regression of the vacancies using a constant, a time trend, and monthly dummies (though dropping the one for April). The results are reported in Table 2, and show that January and December are statistically significant—i.e., they are different from April. Specifically, after accounting for the time trend and constant, with respect to April, January exhibits 171 postings and December -233.

Figure 2: Average HW Advertisements per Month

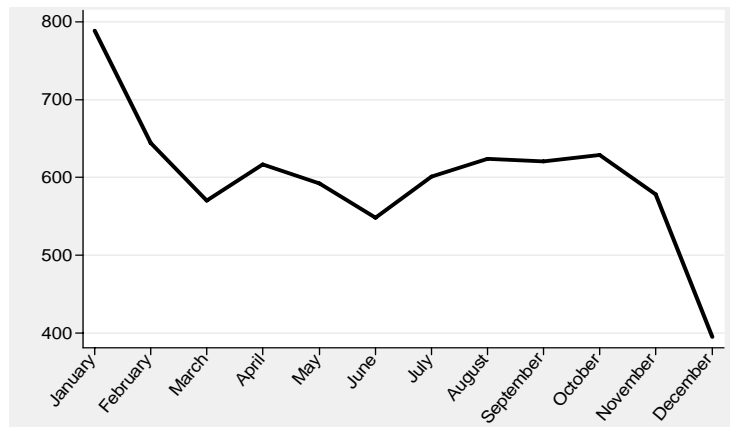


Table 2

Dependent Variable: HW advertisements, 1960:1 to 2010:12

Time trend	1.548*** (0.0527)	August	1.221 (45.64)
January	176.1*** (45.64)	September	-4.072 (45.64)
February	30.51 (45.64)	October	2.517 (45.64)
March	-44.57 (45.64)	November	-49.42 (45.64)
May	-25.90 (45.64)	December	-233.4*** (45.64)
June	-71.39 (45.64)	Constant	146.2*** (36.04)
July	-20.35 (45.64)		
Observations	612		
R-squared	0.612		

Standard errors in parentheses; ***, **, *: significant at the 1%, 5% and 10%, respectively.

These results show that there are indeed seasonal patterns, something researchers using this dataset should take into account. However, in this paper we will not propose seasonally adjusted HW series. The reason is that, in general, the DANE (the Colombian statistical agency) does not officially report seasonally adjusted series. In this respect, the unadjusted series could be more useful for researchers working with Colombian data, and more helpful for understanding certain patterns in the Colombian labor market.

As a matter of fact, the seasonality suggests that the vacancies series could be a leading indicator of the unemployment rate. Traditionally, January has been a

month with high unemployment figures (i.e., 12.5% in 2012, not seasonally adjusted) while December has exhibited low figures (9.8% in 2011). A naïve interpretation would be that the low vacancies in December are a leading indicator of the high unemployment figures in January. A formal analysis of whether the vacancies are a leading indicator of labor market outcomes is beyond the aims of this paper, but would be an interesting task for future research using this dataset.

The vacancy rate

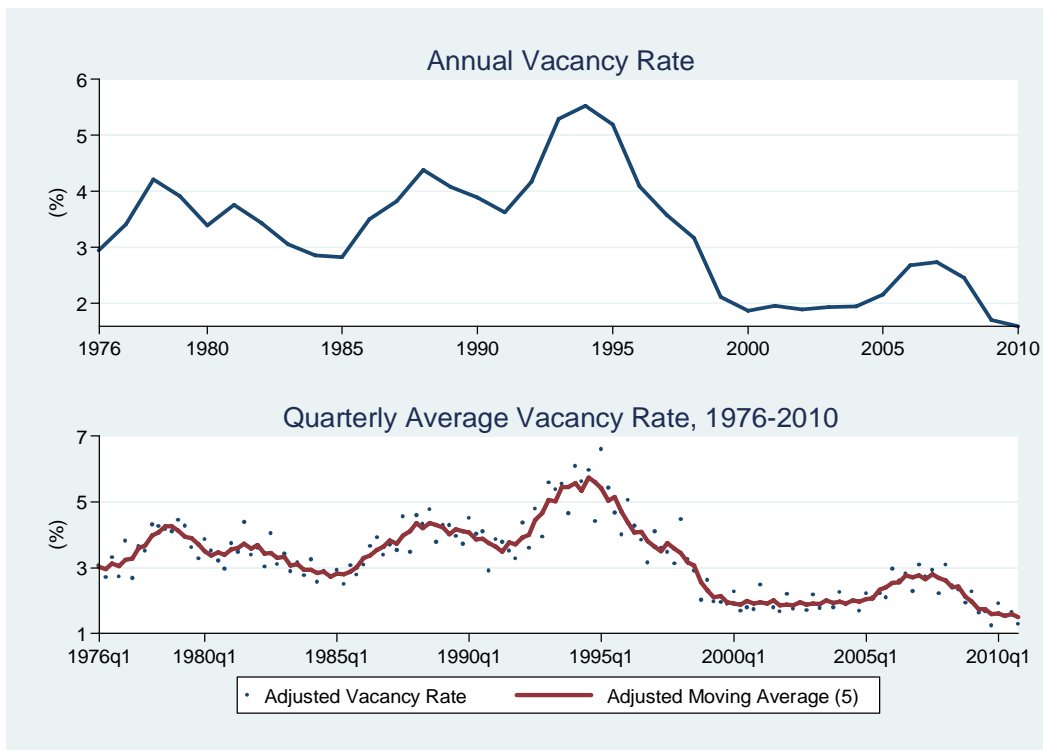
A vacancies dataset based solely on the number of vacant job postings is a misleading indicator of the labor market, especially over long periods of time as they do not take into account the growth of the population or of the labor force. This is even more relevant for a developing country like Colombia, with population growth rates during the seventies above 3% per year.

In the U.S. case, Abraham (1987) and Medoff (1983) construct vacancies rates by dividing the HW index by employment figures. Nevertheless, Zagorsky (1998) suggests that using the labor force is preferable to using employment figures, inasmuch as “it is the smoothest labor market data series and least susceptible to business cycle changes over time.” Following the latter practice, we construct vacancies rates by dividing HW advertisements by the labor force in Bogota. In the appendix, we provide details on the labor force series for Bogota used in calculating the index. One important caveat is that reliable labor force statistics for Bogota are only available beginning with 1976. We report the results in Table 3. They are also depicted in Figure 3.

Table 3
Quarterly Vacancy Rates, 1976-2010

Year	I	II	III	IV	Average	Year	I	II	III	IV	Average
1976	3.06	2.70	3.32	2.72	2.95	1993	5.59	5.38	5.55	4.65	5.29
1977	3.83	2.68	3.65	3.51	3.42	1994	6.10	5.62	5.97	4.41	5.52
1978	4.31	4.25	4.17	4.10	4.21	1995	6.61	5.44	4.68	4.02	5.19
1979	4.46	4.28	3.62	3.27	3.91	1996	5.05	4.29	3.84	3.17	4.09
1980	3.86	3.52	3.21	2.97	3.39	1997	4.11	3.60	3.48	3.12	3.58
1981	3.76	3.49	4.40	3.38	3.76	1998	4.47	3.26	2.92	2.02	3.17
1982	3.59	3.02	4.04	3.11	3.44	1999	2.64	1.98	1.95	1.90	2.12
1983	3.42	2.90	3.17	2.76	3.06	2000	2.26	1.69	1.80	1.74	1.87
1984	3.26	2.58	2.90	2.70	2.86	2001	2.47	1.88	1.80	1.66	1.95
1985	2.93	2.50	3.07	2.78	2.82	2002	2.20	1.76	1.92	1.70	1.89
1986	3.08	3.65	3.91	3.38	3.51	2003	2.18	1.79	1.97	1.81	1.94
1987	3.71	3.55	4.56	3.49	3.83	2004	2.25	1.88	1.97	1.68	1.94
1988	4.61	4.34	4.78	3.79	4.38	2005	2.21	2.10	2.21	2.10	2.16
1989	4.30	4.31	3.96	3.74	4.08	2006	2.98	2.62	2.83	2.29	2.68
1990	4.51	4.04	4.10	2.91	3.89	2007	3.08	2.72	2.93	2.22	2.74
1991	3.87	3.79	3.53	3.28	3.62	2008	3.09	2.45	2.35	1.93	2.46
1992	4.38	3.60	4.79	3.94	4.17	2009	2.26	1.63	1.67	1.25	1.70
						2010	1.90	1.53	1.64	1.29	1.59

Figure 3: Vacancy Rates, 1976-2010



The scale of the vacancies rate requires some discussion. Given that the numerator of the index (the vacancies) is not based on a representative survey, the scale of the vacancies rate is meaningless. This same problem is faced by all vacancies indices based on HW advertisements. For instance, Zagorsky (1998)

builds a long time series (1923-1994) of vacancies for the U.S. based on HW advertisements. He scales up the HW vacancies rate to match the actual vacancies rates obtained using a survey that overlaps a couple of years with the HW series. Unfortunately, in Colombia, there are no vacancies series based on surveys. Thus, we simply multiply our series by 100 and report the results in percentage terms. It should be clear, however, that the series' scale is meaningless.⁹

These raw vacancies rates appear to be consistent with some general business cycle facts related to Colombia's economy. For instance, the busts of: (i) the debt crisis at the beginning of the 80s; (ii) the financial crisis of the late-90s; and (iii) the 2009 slowdown that coincided with the Great Recession in the U.S. are all periods that show falling vacancy postings. Increases in postings are apparent, for instance, during: (i) the late-70s, a period labeled as the coffee boom; (ii) the mid-90s, which saw rapid economic expansion prior to the 1999 recession; and (iii) 2007-2008, a period of fast growth for most of Latin America, inclusive of Colombia. We return to the description of the general trends identified for the vacancies rates in section 6, after discussing certain issues related to this raw series and proposing some corrections to them.

5. Issues and a few solutions

Focusing on a single newspaper

The first point we address concerns the adequacy of focusing on a single newspaper. This requires a brief overview of Colombia's newspaper industry.

Colombia has two major national newspapers and several regional ones. The two largest national newspapers are *ET* and *El Espectador*. They are the main players in the national newspaper industry, as well as the industry in Bogota. As mentioned above, recent data show that the printed version of *ET* is read by

⁹ As mentioned above, there are currently some efforts under way at the DANE to produce vacancy statistics in Colombia. Once available, it should be possible to scale our historical data to match the actual vacancies rates as per Zagorsky (1998).

over 1.1 million people; that of *El Espectador* is read by over 310.000 persons (EGM, 2010).

The vast majority of HW postings over time have been concentrated in *ET*. Table 4 reports the number of HW postings for both newspapers for selected dates. Roughly 90% or more of them are concentrated in *ET*. The figure does not take into account the fact that some postings may have been advertised in both outlets. The existence of a leading newspaper acts as a focal point for attracting both firms and people looking for jobs, thus reinforcing the concentration effect. This could explain why the share of HW announcement is more concentrated than the share of readers.

Table 4
HW postings (third Friday)

	Total	El Tiempo (%)	El Espectador (%)
1965 Jan	189	96%	4%
1975 Jan	364	90%	10%
1985 Jan	643	93%	7%
1995 Jan	2384	88%	12%
2000 Jan	924	98%	2%
2001 Aug	618	98%	2%

Source: Author's calculations.

With such a concentrated market for HW advertisements, focusing on data from *ET* seems a good enough proxy of the overall postings and thus of vacancies in Bogota. Finally, we should mention that the practice of including only the main carrier of HW advertisements in the city was also adopted by the print HW index of the U.S.

Changes in the newspaper industry

Abraham (1987) proposes some corrections to the U.S. vacancies rates based on HW advertisements. Among others, she corrects for the fact that over time the newspaper industry consolidated into fewer newspapers per city. This trend potentially increased the number of HW advertisements carried in the city's main newspapers. Taking into account the variation across cities (something not possible in the Colombian case with the data currently available) in order to

estimate the needed adjustment, she finds that for the 60s, declining newspaper competition accounted for close to half of the drift in the HW-unemployment relationship, but that after 1970, the role of industry consolidation became much less relevant.

In the Colombian case, specifically for Bogota, the main change in the industry for the period under study took place between 2001 and 2008, during which *El Espectador* shut down its weekdays printed version. One might anticipate that this would have led to an increase in the HW advertisements being published in *ET* since 2001. Nevertheless, we believe that the impact, if at all present, is quantitatively small. On the one hand, as shown in Table 4, even prior to the period in question, *El Espectador* contained only a minor fraction of the advertisements that were posted. In 1965, it contained only 4% of them; in 2000, its share was only 2%. Additionally, it is possible that a portion of the advertisements in *El Espectador* were simultaneously published in *ET*, making the former's share even less relevant for our purposes; as for that portion, the shutdown of *El Espectador*'s weekdays printed version would not lead to an increase in *ET*'s HW postings. Finally, the impact of this change in the industry is dwarfed by the simultaneous revolution caused by the appearance of the World Wide Web, especially given the increasing importance of online HW platforms entering the twenty-first century.

Online Help Wanted Advertisements

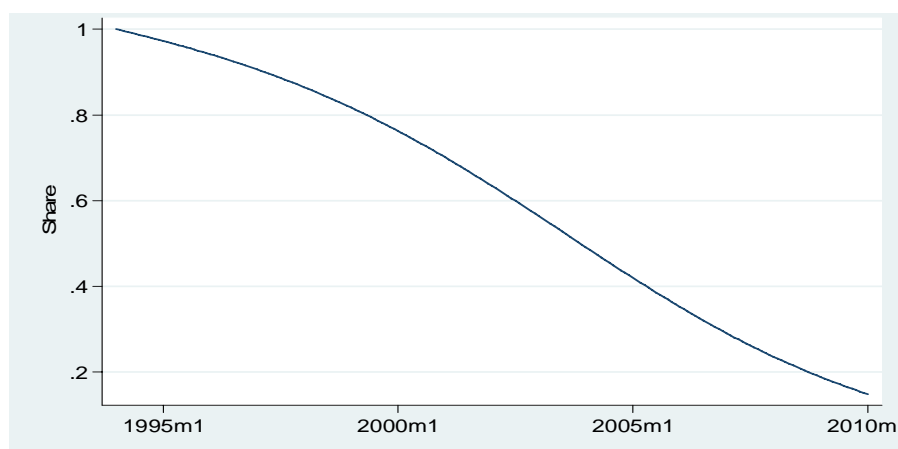
Another important issue with respect to the vacancies index based on print HW advertisements has been the increasing role of online HW outlets and the declining role of print newspapers. As elsewhere, these trends are present in Colombia. A survey conducted among the country's major publishers shows that the readership of the main printed newspapers fell by 22% between 1998 and 2008 (Zuleta et al., 2009), while the number of internet connected homes

multiplied by 12.5 times between December 2000 and December 2008, based on official data.¹⁰

The declining (rising) role of print (online) HW advertisements and its impact on vacancies series such as those used in our paper has been discussed and addressed with respect to the U.S. by Barnichon (2010). For a long period of time, the U.S. relied on print HW data as a proxy for vacancies. More recently, the print help wanted data was replaced by an online HW index. Moreover, as mentioned above, a few years ago, the U.S. began producing survey-based statistics on vacancies, based on the JOLTS. Barnichon (2010) proposes an integrated series of print and online HW datasets. Joining together the different types of evidence for the U.S. (print HW, online HW, JOLTS and the evolution of internet users), he estimates the share of print HW advertisements over time, and proposes a total index of HW advertisements that corrects for the declining (rising) role of print (online) HW advertisements.

He begins adjusting the series in 1995, the year the World Wide Web was first introduced. In Figure 4, we reproduce his estimates for the falling relevance of print share used in adjusting his series.¹¹ The decline of print share is initially slow, then accelerates, and then finally slows down, mimicking the diffusion of the internet over time.

Figure 4: Estimated U.S. share of print advertising, 1994:2010 (Barnichon, 2010)



¹⁰ Source: *Ministerio de TIC* and *Comisión de Regulación de Telecomunicaciones de Colombia*.

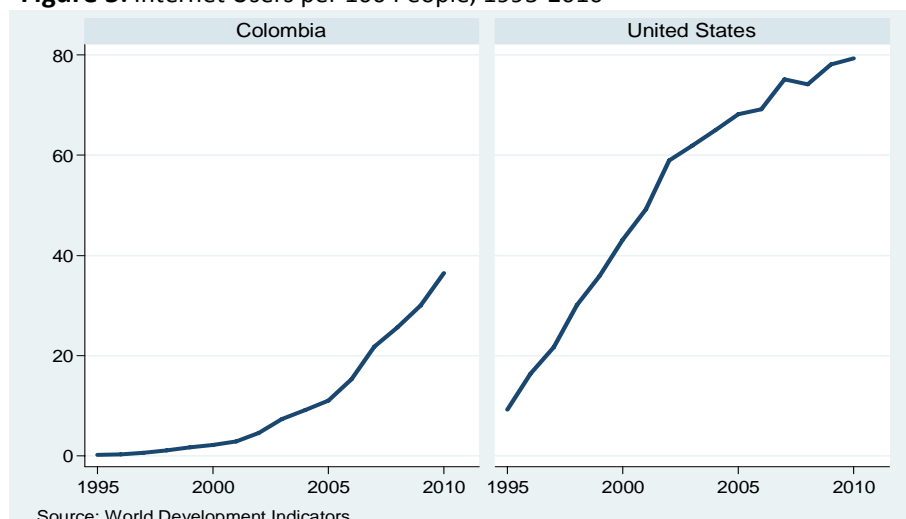
¹¹ We thank Regis Barnichon for sharing the precise coefficients used to produce this plot.

While it would be ideal to use Barnichon's strategy to estimate Colombia's HW print share and adjust our series accordingly, unfortunately, we do not have the information necessary to do so. In particular, we lack data on online advertisements, and we do not have survey-based vacancies either. Thus, we need to adjust our series using less satisfactory means.

In deciding how to adjust the series, we should first note that in the case of Colombia, the point of adjustment comes later than in the case of the U.S. To begin with, online HW platforms only appeared in Colombia at the beginning of the twenty-first century. Indeed, the most important online HW outlet—www.empleo.com, a website in fact created by *ET*—first started in 2000 by simply posting online the printed versions of HW postings from the newspaper. Apart from www.empleo.com, initially there was hardly any online competition with print HW advertisements to speak of. While www.empleo.com does not keep track of postings over time, we concluded after a few conversations with their staff that the webpage only really began gaining steam after 2001, suggesting that no adjustment to the series is necessary prior to that year.

Secondly, the percentage of internet users in Colombia has been less than that in the U.S., suggesting that print share decline in Colombia has a lag with respect to the U.S. For instance, as shown by Figure 5, by 2010, the share of internet users in Colombia had only just reached the rates of internet users in the US as of the beginning of the twenty-first century.

Figure 5: Internet Users per 100 People, 1995-2010



Given the lack of data necessary for generating a Colombian-specific print share, we use Barnichon’s estimates of print share, but with a six year lag—that is, we begin with 2001, the year when online HW advertisements first began competing with print HW advertisements in Colombia. In Table 5, we report the adjusted number of HW advertisements; in Table 6, we report the adjusted vacancies rates. The results are plotted in Figure 6.

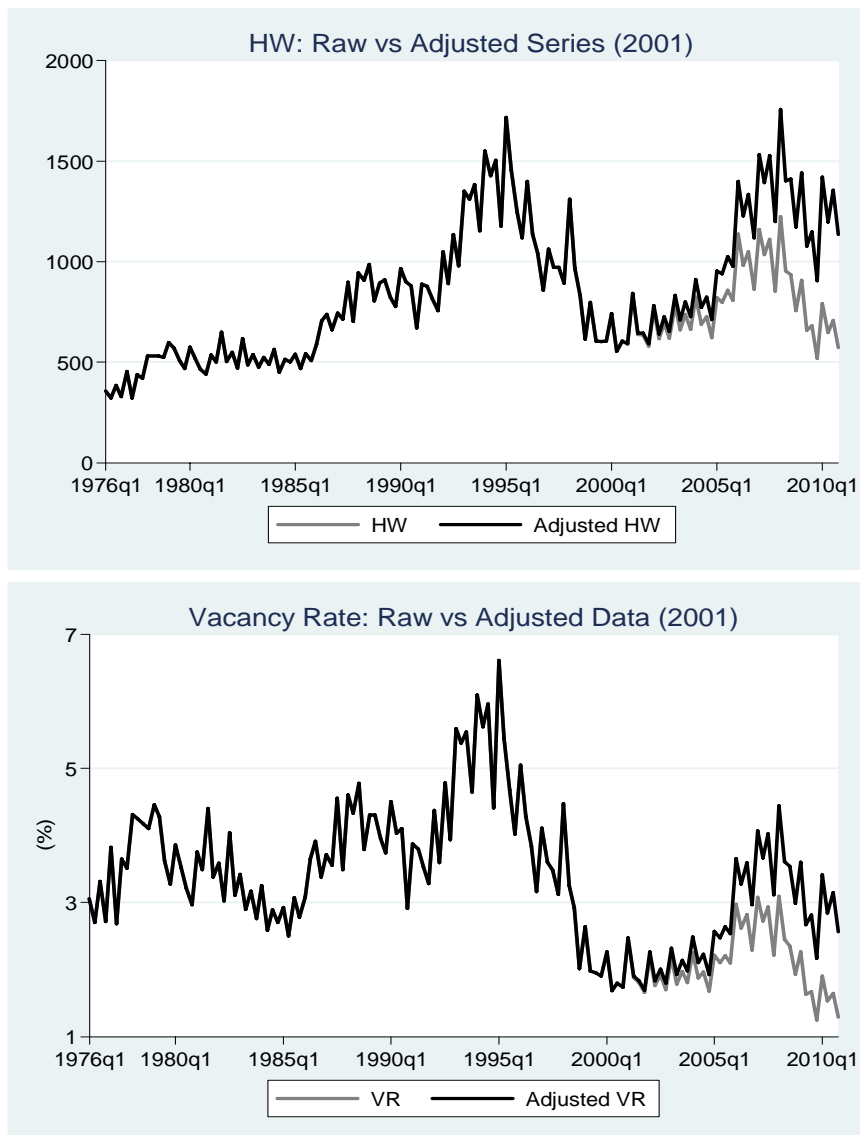
Table 5
Adjusted Number of HW advertisements, 2001-2010

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jan	1008,2	941,0	971,3	1075,4	1211,2	1770,3	1797,6	2283,1	1806,9	1945,5
Feb	804,5	714,0	824,6	888,1	870,1	1316,0	1463,9	1548,0	1377,4	1102,1
Mar	720,7	697,2	710,3	782,0	787,3	1131,7	1361,3	1477,1	1174,9	1251,7
Apr	745,5	718,7	726,5	865,6	978,0	1333,0	1604,6	1334,6	1117,4	1121,1
May	611,7	600,8	754,7	754,2	932,9	1227,3	1387,9	1582,9	1146,4	1325,0
Jun	577,7	603,5	654,3	705,2	920,6	1143,3	1207,8	1322,3	997,6	1186,6
Jul	669,4	761,1	770,4	774,8	1076,6	1256,8	1598,4	1443,6	1076,6	1361,4
Aug	618,0	679,2	802,3	882,5	1062,6	1358,9	1508,8	1319,0	1252,5	1346,3
Sep	650,1	746,4	837,7	822,1	952,2	1409,6	1507,2	1510,0	1153,6	1403,5
Oct	670,1	814,0	855,9	775,1	1050,2	1217,4	1354,0	1399,5	1075,2	1380,6
Nov	684,0	705,1	813,8	773,7	1038,5	1135,1	1442,0	1127,7	935,6	1053,6
Dec	426,7	449,2	515,4	595,5	854,2	1020,3	824,1	1013,4	725,6	1009,5

Table 6
Adjusted Quarterly Vacancy Rate, 2000-2010

Year	I	II	III	IV	Average
2001	2.48	1.90	1.83	1.69	1.98
2002	2.27	1.83	2.01	1.80	1.97
2003	2.32	1.92	2.14	1.98	2.09
2004	2.49	2.10	2.23	1.92	2.19
2005	2.57	2.48	2.64	2.54	2.56
2006	3.66	3.28	3.59	2.97	3.37
2007	4.07	3.66	4.03	3.11	3.72
2008	4.45	3.61	3.54	2.99	3.65
2009	3.60	2.67	2.81	2.17	2.81
2010	3.41	2.84	3.15	2.56	2.99

Figure 6: Raw and Adjusted Quarterly Series, 1976:2010. Adjustment Starts in 2001.



The adjusted vacancies rate seems more in line with the business cycle over the last decade. For instance, for 2007-08, during which there was strong economic expansion, the adjusted vacancies rates are also high (not only rising), something that was not the case for the unadjusted vacancies rates.

Sectoral disparities

Abraham (1987), in discussing the usefulness of the print HW index in the U.S., suggests another potential source of bias. She points out that, over time, some sectors of the economy shrink while others expand in relative terms. If some sectors are more (or less) prone to post HW advertisements, then such economic changes should have an impact on the HW index. Abraham's estimates show that these changes appear to constitute a quantitatively negligible source of bias in the U.S. HW indices. In Colombia's case, it is not possible to estimate whether those changes have an impact on the HW index. The reason is that we do not have data on the sectoral composition of advertisements over time. This remains an interesting task—though daunting in terms of data collection—for future research.

The cost of advertisements

The cost of publishing advertisements could change over time and thus affect the quantities of advertisements published in *ET*. At least two sources of price variation in the advertisements are likely. On the one hand, it is conceivable that the relative price of advertisements changed over time. On the other hand, it is possible that *ET* offered temporary discounts for posting advertisements. This could spuriously increase the number of HW advertisements recorded on selected dates in our series. Unfortunately, we do not have information on the prices of advertisements over time. Thus, we only highlight the problem but cannot offer any solutions or an assessment of whether this price changes are in fact present in the data.

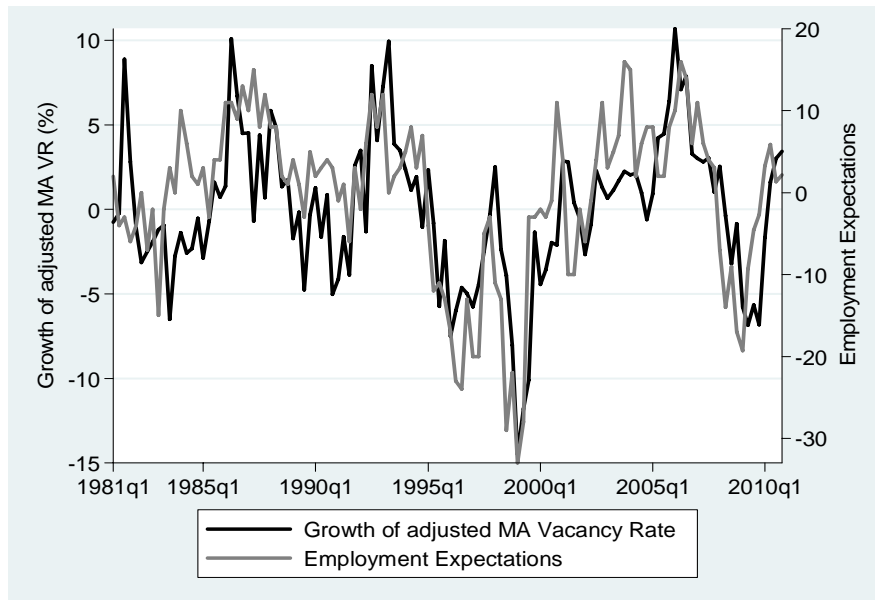
Comparison with other series

We make a final check regarding our series by comparing it with that in a survey by Fedesarrollo, one of Colombia's main economic think tanks. In

particular, Fedesarrollo has, since 1981, conducted a quarterly survey of firms in Colombia’s major cities. One of the questions the survey asks is the following: “Abstracting from normal seasonal fluctuations, do you foresee that in the next three months the number of employees in the production line will increase, decrease or stay constant?” This question provides some clues as to firms’ expectations regarding potential near-future *changes* in vacancies for worker positions in the production process. Assuming that this interpretation of what the question captures is correct, Fedesarrollo’s series contains less information than our vacancies series in the sense that it is more a proxy of the *growth* in the *trend* in vacancies, than an actual vacancies series.

In Figure 7, we plot the balance of Fedesarrollo’s question – that is, the difference between the percentage of those answering “increase” minus the percentage of those answering “decrease.” We label this variable Employment Expectations. We also plot in the Figure the quarterly percentage *growth* of a *trend* version of our vacancies rate. The trend is a simple four quarter moving average of the adjusted vacancies rate. It is apparent that the two series track each other over extensive periods of time. The correlation between them is 0.67.

Figure 7: Employment Expectations and the Growth of the Trend (MA) Vacancies Rate, 1981-2010.



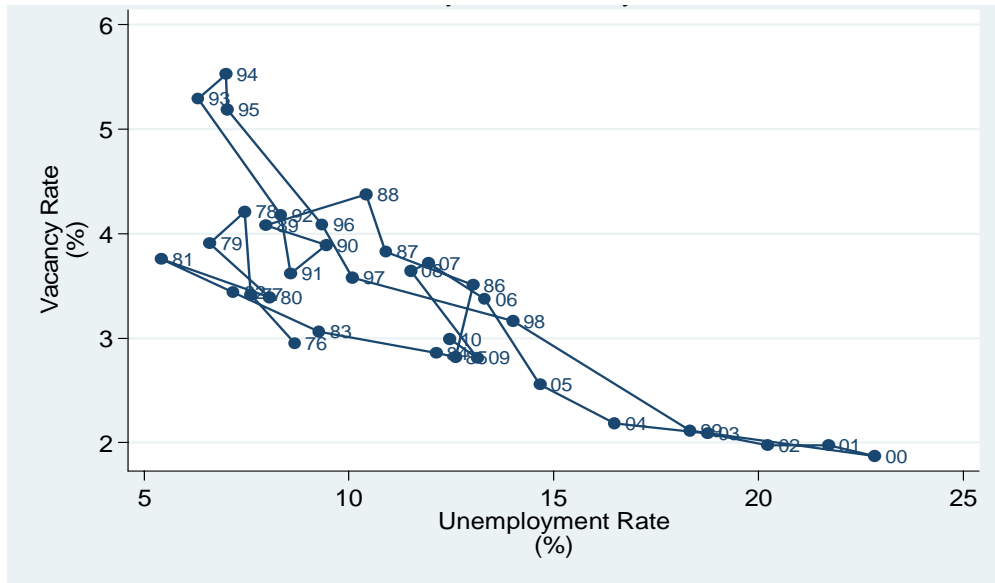
The above exercise is not meant to be conclusive regarding the predictive capacity of our series; nonetheless, it does show an interesting pattern in that it corresponds to firms' expectations regarding changes in their own labor demand. While an extensive analysis of the co-movement of the series goes beyond the objectives of this paper, the disparities between the two series, shown in Figure 7, calls for an analysis of the evolution of expectations and shocks to firms, and their effect on the labor market.

6. Some preliminary applications

The Beveridge Curve

An obvious application of the proposed dataset leads to an analysis of the unemployment-vacancy locus, the so-called Beveridge curve. Again, we do not intend here to delve into a detailed analysis of the evolution of the Beveridge curve. We simply depict the relationship in order to check whether the curve has the expected shape according to theory (for example, Blanchard and Diamond, 1989). In Figure 8, we depict the relationship using the adjusted vacancies rate. The figure does indeed have the expected shape. A large outward shift is apparent for the mid-80s. In Álvarez and Hofstetter (2012), we take a closer look at the relationship, its changes over time, and possible explanations for this.

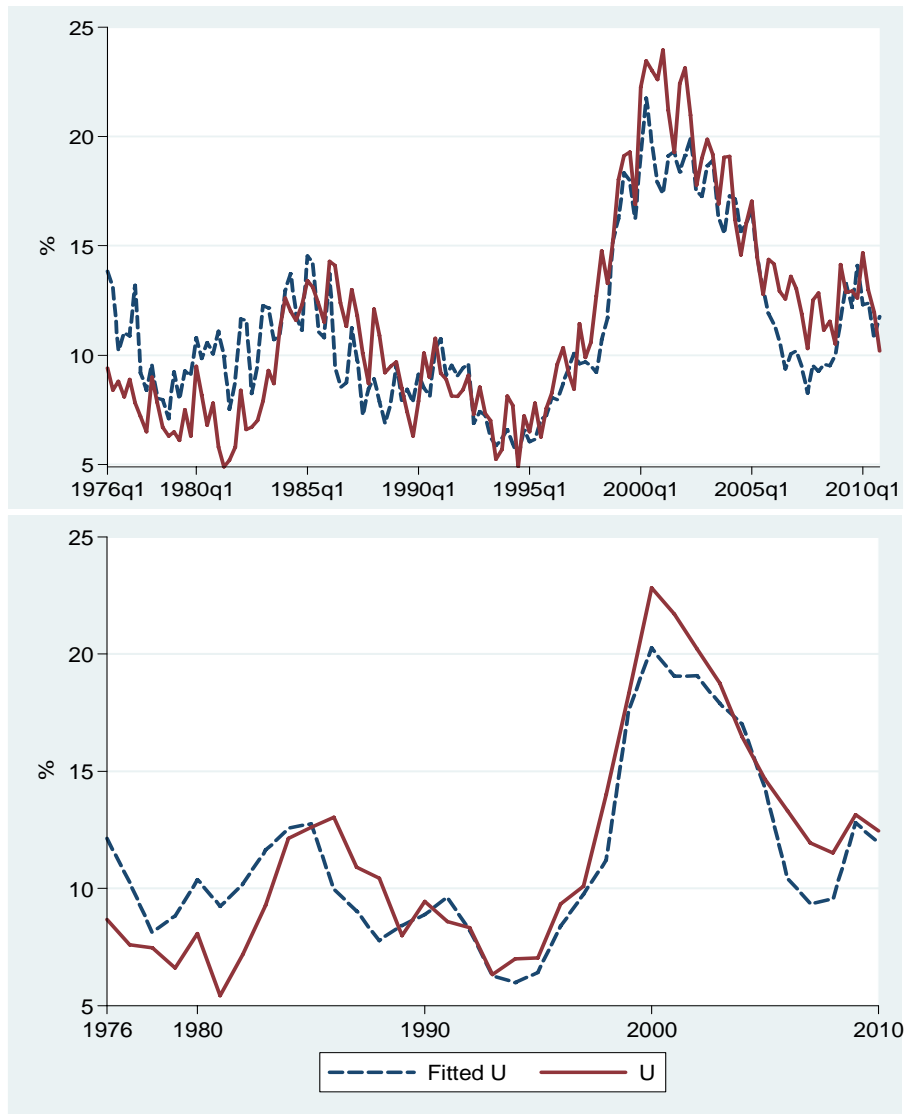
Figure 8: Beveridge Curve, 1976-2010.



Forecasting the Unemployment Rate

To complement the plot, we estimate a Beveridge equation by regressing the log of the unemployment rate on the log of the vacancies rate and a constant (or dummies for each quarter when using the data at a quarterly frequency). In Figure 9, we depict the evolution of the unemployment rate over time along with the predicted value according to the estimations in the aforementioned regressions. Considering the parsimony of the models and the lack of econometric sophistication, the vacancies do a remarkably good job tracking the unemployment rate, especially after the late-80s; of course, the poorer job done by the model for the earlier part of the sample is the consequence of the apparent shift in the Beveridge curve that occurred after the mid-80s.

Figure 9: Actual and Fitted Unemployment According to the Beveridge Curve. Quarterly Data (Top Panel) and Annual Data (Bottom Panel).



Using the Beveridge Curve to adjust for the online HW advertisements

The previous application of the data on vacancies suggests an alternative way of choosing which year to start adjusting the series based on the rise in internet platforms for advertising vacancies. In particular, we run an algorithm that chooses the starting date of Barnichon’s adjustment strategy so that the gap between the predicted and actual unemployment rate becomes minimized by 2010. Of course, this strategy assumes that the gap between actual unemployment and its predicted value in Figure 9 is a measurement error (due to declining print share) rather than a shift in the Beveridge curve. Reassuringly

for our choice of 2001 as the starting year for adjusting the series, the algorithm identifies exactly that year.

7. Final remarks

Although theoretical developments in labor economics over the last few decades calls for the empirical measure of job vacancies, this kind of data remains scarce for developing countries. In the case of Latin America, there are no official data on vacancies, and only a few attempts have been undertaken to build historical series on vacancies. Using mainly the experience of the Conference Board's HW index that has provided the main proxy for vacancies in the U.S. over the last several decades, we construct in this paper the first job vacancies series for Colombia.

The reach of our series is restricted to Bogota and lacks certain desirable attributes, such as a sectorial differentiation. Nonetheless, the evolution of the vacancies rate derived from the raw data shows interesting properties echoing historically relevant episodes of Colombia's business cycle during the last half-century. Moreover, a myriad of questions for future research arise with respect to this 50-year long job vacancies series. We hope that future research—our own and hopefully that of others—will pick up on some of the more salient questions arising from a more careful examination of the dataset.

In addition to providing a useful dataset for future research on some unexplored aspects of Colombia's labor market, we also hope that other scholars and policymakers will be able to improve our proposed vacancies rate. Several potential avenues come to mind. The series could be extended to other cities in the country, allowing for a better proxy of the national historical vacancies rate. Another extension might involve dividing advertisements according to the economic activity or required job qualification. Future research could also come up with better ways of correcting for such issues as the

declining role of print HW advertisements, or changes in the media industry, among others.

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Appendix

Labor Force:

In order to build comparable series of the labor force, we made some adjustments to the available data. Our labor force data starts in 1976, when DANE did the first systematic Household Survey - *Encuesta Nacional de Hogares* (ENH). Since then two important breaks in the methodology have occurred:

1. In 2001 the ENH is replaced by the ECH (*Encuesta continua de Hogares/Continuous Household Survey*). The main differences between ECH and the ENH (in Bogota) are first, that the ECH collected the data on a monthly basis and the ECH on a quarterly basis and, second and more importantly, the ECH modified some of the conditions that define the labor force.^{12,13}
2. In 2006 the ECH is replaced by the GEIH, a survey that in the initial years of the implementation caused a break in the series that was dealt with by an experts' commission.

This appendix describes the precise sources of our data, the observed breaks and the adjustments we made.

The series:

1. 1976-1990: **Source:** Stages 10-70 of the National Households Survey (DANE) **Frequency:** Quarterly. **Expansion Factors:** Based on the adjusted population projection from the 1985 census.
2. 1984-2000: **Source:** Stage 43-110 of the National Households Survey (DANE) **Frequency:** Quarterly. **Expansion Factors:** Based on the population projection from the 1993 census.
3. 2000-2008: **Source:** Two households surveys—the ECH and the Gran Encuesta Integrada de Hogares (GEIH). The main difference between them is the collection method and the size of the survey.¹⁴ **Frequency:** data recollection: monthly; sample representation: quarterly. **Expansion Factors:** Based on the population forecast from the 1993 census.

¹² For a discussion and different methodologies to splice this series, see Arango et al. 2006.

¹³ The main differences in the definitions are: 1. Change in the definition of Unpaid Family Worker: from minimum 15 hours of work per week to minimum 1 hour per week. 2. Change in the definition of unemployed: referenced period of the job search, from one week to four weeks, to be classified as unemployed; moreover, immediate availability is now a condition to be classified as unemployed.

¹⁴ More information available online from DANE website:

http://www.dane.gov.co/index.php?option=com_content&view=article&id=121&Itemid=67

4. 2004-2011: **Source:** GEIH **Frequency:** data recollection: monthly; sample representation: quarterly. **Expansion Factors:** Based on the population projection from the 2005 census.

The splices:

To construct comparable series of Bogota’s labor force, we used the following splices:

1. To splice the first and second series, we use the six years of overlap, to build an adjustment factor (*Af*) that corrects the effect of the change of basis in the population projections:

$$Af = 1 + \frac{\sum_{i=1984q1}^{1990q1} \frac{I_{sample\ 2\ i} - I_{sample\ 1\ i}}{I_{sample\ 1\ i}}}{24}$$

That adjustment factor was used to transform the data between 1976 and 1983.

2. The resulting series and the third series were joined with a similar strategy although with only a one year overlap. In this case the adjustment factor was used to transform the data between 2001 and 2010.
3. Finally, to update the series to 2010, we used the implicit growth rate from the last series (2004-2011).

Unemployment:

The 2001 break also affected the unemployment rate. Hence we adjust the unemployment rate as we did with the labor force. The result was an *Af* of 1.13, then used to transform the data from 2001 to 2010. A similar adjustment was implemented in Ball, Hofstetter and De Roux (2011). They used an *Af* of 1.19. Their series though correspond to the national unemployment rate, not the one in Bogota used here.