Linux and Economics and the Economics of Linux: Part I

Franz Hamann

12th February 2002

If you are reading this article you must be in front of a computer. My best guess is that you are using some version of MS Windows Operating System (OS). Don't worry, 99% of the computer users in the world use it. My second best guess, is that you clicked on this link because you want to know what Linux is, or how does it relate to economics or perhaps because you are tired of reading boring economics papers or, even worse, you don't even know what in the world Linux is! Well, in this series of articles I try to fullfill your needs.

In this article I will roughly describe Linux and present it as a tool to do economic (and scientific) research. I will argue that Linux is far superior than Windows for this matter. In the next article I will focus on Linux as a solution for the government and the enterprise.

What in the world is Linux?

Linux is a free UNIX-like Operating System that is designed to run (mostly) on Intel-based (maker of Pentium processors) computers.[1] The main feature is that Linux is "Open Source". It is distributed under the GNU General Public License, GNU-GPL, of the Free Software Foundation. The key aspect of the GPL license is that you can have access to the source code of the OS and you can also modify it to fit your needs, but you can not hide those modifications. This type of license embraces the essence of scientific knowledge and progress.

Technically, Linux is just the kernel of the OS.[2] It is the core software that interacts with the computer's hardware and manages the operation of other software programs. There are many flavors of Linux, called "distributions". RedHat, SuSe, Debian, Mandrake, are some of them. These distros put Linux and other free software together and sell them as an OS. However, since they are GPL you can download the distro from the Internet or copy the CD's from a friend at a negligible cost. The most popular distro is RedHat. The installation and maintenance of the OS is fairly easy.[3]

[1] Linux also runs on other architectures as Compaq's Alpha and Sun's Sparc.

[2] The kernel was originally developed by Linus Torvalds in 1991 at the University of Helsinki. Nowadays hundreds of developers from all the world contribute by sending patches and fixes to improve Linux performance.

[3] If you send me an e-mail I can burn the copies of the latest version of Linux RedHat.

The software included in the Linux not only worth thousands of dollars, but it is relevant for scientific research. The GNU programs include the **g77** compiler for FORTRAN, **gcc** compiler for C/C++, the \textbf{bash} shell, the **emacs** editor and the **gdb** debugger to name a few. Other software include the X-Window System, the **tetex** engine for LaTeX, other programming languages as Python, Perl, etc.

The latest version of Linux can be installed on a Pentium 133MHz with 32MB RAM and will run decently. Without the graphical interface, it can even run in a 486. In more recent machines like Pentium 3, 4 or Athlon, Linux literally flies. Furthermore, these machines can be networked not only to satisfy different necessities (mail server, www server, number crunching, econometric estimations, graphics visualization, etc.) but also to operate as a single supercomputer (the Beowulf Project is an example).

Why Linux for Economics?

There are several reasons why Linux boosts your productivity in the long-run. First, Linux is very stable. This make it perfect for numeric computations. For example, say you have a routine to solve a dynamic programming problem with several state variables, so that your machine may spend days (perhaps weeks) finding the solution. A crash at the third day during the execution of the code is far from funny.

Second, Linux is designed to interoperate through networks between different users. You can set up a network file system to share files, data, programs and information with students, co-authors, etc. Or, you can work at home and access your office computer securely through **ssh**.

Third, since Linux is free your budget constraint relaxes and you can buy more commercial software to run in Linux. For econometrics, the professional economist can use RATS, Shazam, Limdep, TSP, S-Plus and SAS. As of mathematical software Matlab and Mathematica also offer Linux versions. However, if you cannot afford them, there are free alternatives, like Scilab and Octave to Matlab and R to S-Plus.

Fourth, the majority of the numerical routines are written in FORTRAN77 and C/C++. These routines run smoothly on Linux due to the integration of compilers and the stability of the OS.

Fifth, to type professional papers Linux comes with tetex. It is a typesetting environment that uses LaTeX. If you are new in the TeXdomain you can use **LyX** which provides a front-end for LaTeX, in the spirit of Scientific Word. Now, if you are a die-hard Office user (practice that I do not advice[4]) you may want to use Sun's StarOffice.

Finally, Linux is virus free! So, forget about Melissa, ILoveUs and all types of bugs, worms and snakes that plague the rest of the computing world.

[4] Programs as Word and Excel are not designed for the scientific environment. They cannot handle equations and mathematical formulae in a satisfactory manner.

Conclusion

Now my final guess: you are eager to rush and put Linux in your machine. But let me cool you down. Before doing that, do some research. It is advisable that you learn as much as possible of Linux, before tossing away your latest version of Windows. Check whether your hardware is supported. It is very likely that it will, but sometimes computers come with Winmodems, Wincards, etc that are specially designed for Windows. Also, if you don't want to loose your driving skills in F1-2001, you may consider a dual boot system. This is the smartest way to start.

I have argued (and hopefully proved) in this article that Linux is a far superior alternative to Windows for scientific research and in particular for economics research. Balancing software cost and performance, Linux must be the choice of the professional economist.

In the next article I will consider Linux vs. Windows in the corporate and government environment.