

# Journal of Economics Bibliography

www.kspjournals.org

Volume 1

December 2014

Issue 1

## Economics of Qwerty and Fgğiod

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**Abstract.** After summarizing the path dependency concept which began with the article named as “Clio and the Economics of Qwerty” written by Paul David in 1985, I will associate the path dependency with the reasons of why is F keyboard not used widely instead of Q keyboards, even though F keyboards were tried to be mandatory by the state in our country.

**Keywords.** Paul David, the path dependency, Q keyboard (qwerty), F keyboard (fgğiod).

**JEL.** B25, B52, K23, K29, O33.

### 1. Introduction

**W**hy is Q keyboard, that is sourced back to typewriter era, used by millions more dominantly? The question above gains more sense if we think about today millions of people all around the world communicate each other with Q keyboard (qwerty) system in the technology era. We encounter much more interesting situation when we limit our analysis from world around to only our country. The usage rate of F keyboard, which was aimed to be used as a standard Turkish keyboard throughout our country and to create a national keyboard in 1950 in Turkey, decreased over time and today it is almost zero. Even though the state support, F keyboard is not chosen to be used instead of Q keyboard, which is clearly not suitable to Turkish Language. Why?

### 2. Q Keyboard (qwerty) and the Path Dependency Case

The key sequence, known as Q keyboard, has been subject to a little change since the typewriter was invented. The most commonly accepted one from several explanations about the key arrays is as follows (David, 1985). In 1867, Christopher Latham Sholes who is the inventor of the typewriter, took out its patent and encountered a mechanical problem, which is caused by the machine design while starting to take the first sample works from the typewriter. The typewriter’s mechanic letter arms, which are utilized for printing letters onto a paper, are located in a closed box. It caused the paper squeezed inside the machine when two arms took off at the same time. For this problem’s solution, Christopher Sholes tried to mix the letters in the keyboard as much as possible in order to slow down the writer’s typing speed, furthermore he placed the most commonly used letters to the hardest reachable place in the keyboard, then the key sequence had been emerged that we name it as Q keyboard. Actually, it can be said that, Q keyboard had been emerged to force the writer to type slowly because fast typing causes to typewriter breakdown. In particularly, the most commonly used letters were distributed to the farthest corners in the keyboard. By this way, generally right handed people are forced to use their left-weak hands, so these letters are placed

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toward left side in consciously. Actually there are some arguments, which are very intense that Q keyboard is not beneficial to almost any languages including English, too. Q keyboard is the most commonly used key sequence in all around the world although a suitable and distinctive keyboard was produced for every language and even the idea of Q keyboard is not suitable for any languages.

Indeed, in 1873 Q keyboard was designed as a monument of engineering contradiction in a sense. Q keyboard has still been used when even breakdown problem of the typewriter was handled with the invention of computers. In the meanwhile there have been many people who think there can be many good alternatives of Q keyboard throughout the history as typing fast gaining importance. For example, in 1932, Prof. Dr. August Dvorak from Washington State University offered a key sequence in which the most commonly used letters in English take place in the middle array, which is the easiest reachable place in a keyboard. Two-staged study had been performed in the leadership of Dr. August Dvorak. In first, letter usage frequency table had been created by analyzing the words' usage frequency in English. Secondly, the letters' places are organized from easy to difficult according to human fingers' physiognomic features. Furthermore human hands were aimed to work in coordination by the way of vowels were places to generally left hand and consonants are placed to right hand. Dvorak took out the patent of his simplified keyboard in 1932; however it could not have been replaced to Q keyboard which has been already widely accepted in the American society (Oz, 2001).

Path dependency is a concept which is across to systematic power and mechanism that are taking an important place in the idea of classical balance. Incidental and small historical events can determine the hereupon occurred developments settling direction. According to the path dependency which makes focus on the historicity, the small historical events can be trigger factor to inactive balance path. On the other hand, according to mainstream economics incidental events can not affect the idea of economic development. (For instance, see: [Vromen and Jolink, 1997](#)). Therefore, the path dependency theory emphasizes the role of the historical processes in explaining the dynamic nature of economic development. Long-term behavior in the economic events is affected by short-term factors. (About the path dependency, see: [Yalçıntaş, 2006; 2009; 2012](#)).

In 1985 Paul David, in his article of "Clio and the Economics of Qwerty" studied the relationship between the keyboard which was offered by August Dvorak and the Q keyboard which was invented and developed by Christopher Latham Sholes in 1873. Thus as a result, he presented that nobody preferred Dvorak's keyboard due to its inconveniency and at the same time, reciprocally Dvorak keyboard was found difficult because nobody preferred it in the way of feedback. According to David, usage of Q keyboard is inactive and the main reason why people are still using it is because the conversion costs to starting to utilize more efficient keyboard standards are high (David, 1985).

Furthermore, according to David the same positive feedback caused the typists lockup in this technology. Typists started to learn the Q keyboard, which is widely popular in the market. Qwerty installing system's overall user cost is reduced when Qwerty was started to be accepted more dominantly over other keyboard systems. Thus, the better designed machines gained only a little market rate. In particularly, 1930s Dvorak's simplified keyboard was not successful in the market even though its ergonomic features. David gave example of American Army for the best proof of Q keyboard success. David's other emphasis on his studies was the effect of ten finger typing feature was developed only for Q keyboard. David reached a result of the keyboard, which is used even today, is inherited from the past. It is not about the keyboard's ergonomic or economic convenience ([Şişko, 2010](#)).

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Some corporate economist like Stan J. Liebowitz, Stephen Margolis, Neil Kay and Jean-Philippe Vergne argued that Q keyboard became popular because it was active as opposed to Paul David and his argument that Q keyboard became popular even though it was not active and it created the path dependency. [Liebowitz and Margolis \(1990, 1995\)](#) from these economists did not use the thesis of David regarding to the subject in explaining the success of the Qwerty. As opposed, they rejected his claim that Qwerty's source of success is about only the typing competition issues. Liebowitz and Margolis claimed that Qwerty's success was not associated with these type of competitions because non users of Qwerty won many typing competitions. They gave examples that the competition which is happened in Toronto three weeks later then Cincinnati competition and written 126 words within a minute and thereafter in Brooklyn competition, written 179 words in a minute. In both of these competitions, Caligraph machine users won. However these examples did not mean David to explain the Qwerty's success depending on only the competitions in which Q keyboard users won. David claimed that besides the fast typing effects, there are many other effects on the Q keyboard's widely acceptance.

Another corporate economist Jean-Philippe Vergne, as contribution to the arguments of Liebowitz and Margolis, in his article named as "Qwerty is Dead; Long Live Path Dependence" published in 2013, referred [Tanjim Hossain and John Morgan \(2009\)](#). In 2009, they claimed Q keyboard is not a good example regarding to the path dependency and they tried to offer solutions to this problem as performing controlled experiments. Depending on the Hossain and Morgan's findings, as opposed to arguments that are offered in the dynamic competition relations between keyboard systems, Qwerty keyboard standards can never be a kind of inferior keyboard system. Depending on their studies, Hossain and Morgan found out the ideas, that the theoreticians who thought about the Qwerty keyboards market failure will make them lead into a big mistake because Qwerty effect, which was clearly associated that it is not enough based on the theoretical probability claims, as sourced the insufficiency of both market and laboratory findings ([Vergne, 2013](#)).

In his article published in 2013, Jean-Philippe Vergne goes on his claims on the subject as referring to Neil Kay. In the article which named as "Rerun the Tape of History and Qwerty Always Wins" written by [Neil Kay in 2013](#), he agreed the terms of de Liebowitz, Margolis and Hossain, Morgan and claimed the followings about the Q keyboard system; "Qwerty wins the competition even though you create the history from the beginning and choose the Dvorak's simplified keyboard before Q keyboard was invented."

It can be seen that economist will continue to discuss the Q keyboard system in association with the path dependency. In the following part of this article, our discussion will go on about the F keyboard system, which is a good example of path dependency, however its usage rate decreased over time in our country.

### 3. F (Fgğiod) Keyboards

Studies about creating a new keyboard was launched but not gotten successful results after alphabet revolution, in 1928 in Turkey. A commission, which was composed of İhsan Sıtkı Yener and representatives of ministries decided various types for 42-46 button machines that were used in this period. Anthony R. Lanza and Edwark Tutark Jr. (American Education Counsellors) involved in the studies, when they came to Turkey in association with the cooperation agreement between Ankara University and New York University. The team coming from New York University summarized their studies in a report submitting to International

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Cooperation Administration, which financed their studies. According to the report, It can be saved 43.500 Turkish Liras in a year if a keyboard which is suitable for Turkish Language is created and can make it standardized (Muhit, 2011).

Two commissions were set for the invention of Turkish keyboard, the first one studied Turkish letter usage frequency and concatenation; the other analyzed the human fingers' physical features. İhsan Yener led the commissions and he believed the necessity to create a Turkish national keyboard depending on the scientific sources. He analyzed how many times 183 thousand 596 letters are used in 29 thousand 934 words, the information was obtained from TDK guide. He had his fingers' X-rays, analyzed muscle and nervous system and identified physical forces and motion characteristics. According to studies completed in that period, they found out that the most frequently used 5 letters in Turkish are a, e, k, i and m. Then, the letters that were identified as mostly used letters were placed in the middle array in the keyboard. Furthermore, in order to balance the usage of both hands, the letters were organized as 49 percent on left hand oriented and 51 percent for right hand oriented. Thus, F keyboard which is used today, is accepted and announced as a standard Turkish keyboard in October, 20, 1955 (Ersöz, 2003). In 1963, as contribution and prevention policy for F keyboards, a law is added to Customs Law as "later on imports will only be suitable on the standard Turkish Keyboard". However, due to high cost and its difficulty, it had been decided that the present typing machine will be used. In Turkey the idea of all the typing machines' conversion to "national keyboard" was became definite by in 1963 adding a law to Customs Law and in 1974 assigning it as an Obligatory Standard by Turkish Standards Institute (Muhit, 2011).

All the vowels were gathered in one hand for the purpose of ordering the both hands' fingers come one after another as giving importance to Turkish general word occurrence of one vowel come after one consonant relation. The least used consonants were oriented in the left hand. All the consonants were placed in the right hand due to the fact that right hand is generally more powerful than left hand. The usage frequency rates of both hands were organized depending on the fingers' physical strengths and motion capabilities. Index finger is more useful than little finger; therefore the most common used letters were oriented beginning from the index finger to the little finger. The rate of writing two letters with a hand in succession was 10%. Pushing the letter buttons by a finger in succession rate was 1%. Efficiency flow (comparison to the former keyboard systems) was 60%. It was created by classifying the 183.596 letters in 29.934 words in Turkish (Tanış, 2010).



Figure 1

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### *3.1. The Comparison Between Q Keyboard and F Keyboard*

It can be seen more clearly that the letter placing system differences between the keyboards when we analyze the Figure 1, which represent the F and Q keyboard, available in above. For example, in Figure 1, when we look at F keyboard we can see that vowels were placed in one hand and consonant were oriented on the other hand. However, in Q keyboard, we can clearly see that such a convenient system is not available. F keyboard can be used more efficiently than Q keyboard because of the Turkish general word system in that one vowel comes after one consonant and this makes typist to use one hand and the other in succession. When we go on our discussion as analyzing the most common letters in Turkish, we can see that the most common used letters are oriented in the basis array in F keyboard however in Q keyboard these letters are placed in randomly. If we need to be more specific in the subject: "A" letter is the most frequently used vowel in both Turkish and English. When we investigate the both keyboard, we can easily see that "A" vowel is located in the areas of our left index finger in F keyboard and of left little finger in Q keyboard. In this situation, extortunately left hand index finger will work while using F keyboard, and left hand little finger will work as using Q keyboard. Left hand index finger is one of the most easily used fingers, however in Q keyboard on the area of left hand index finger there is "F" letter which is relatively less used letter. We can say that F keyboard is superior over Q keyboard when even only we think of these examples ([Tanış, 2010](#)).

Writing a Turkish article most probably takes a little time while using F keyboard than using Q keyboard because it was invented primarily for Turkish Language. The most frequently used letters in Turkish were ordered more conveniently in F keyboard. F keyboard system's standard is much better than Q keyboard system because the letters which come one after another were ordered for different fingers. Additionally, in a simulation that was created for the analysis of time losing of fingers' moving one button to another, it was seen that F keyboard standardized speed is 11% better than Q keyboard. Again, in the same study, depending to contemporary Turkish if we change some letters' location slightly, they can be written faster at rate of 46% comparison to Q keyboard ([Tanış, 2010](#)).

### *3.2 F Keyboard Example for the Path Dependency*

There is not a world standard on creating the keyboards, and it cannot be whenever there exist sound, syllable and letter distinctive features of different language user societies. However, in our country Inter-ministerial Committee for Standardization had announced that F keyboard is the most useful keyboard system for Turkish Language, officially in October, 20, 1955 thus Turkish Standards Institute and the State Supply Office adopted the decision. The efforts had been made about the typewriters imports to Turkey of having the basis of F keyboard depending on the law which was added to the Customs Law in 1963. Firstly, in 1974 F keyboard was assigned to "Obligatory Standards" by Turkish Standards Institute ([Akalm, 2003](#)). However a question can be asked like "What is the usage rate of F keyboard though the state support? According to Serdar Bilecen, former board member of Turkish Informatics Association, the answer for this question is usage rate decreased up to 10% although F keyboard is more suitable to Turkish Language and more convenient for fast typing.

In this part of the article, depending on the above mentioned knowledge, we will focus on why F keyboard is not used as opposed to Q keyboard, even though the state ordered the public administrative employees to use only F keyboard before 60 years when the keyboards were dominated by typewriters and F keyboard usage was prevented by the Custom Law which makes restrictions to import Q keyboards. Furthermore, the most important issue, we analyzed F

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keyboard which was claimed that it is that most useful for Turkish Language and more convenient to fast typing as opposed to Q keyboards, thus we will claim that depending on F keyboards' path dependency thesis, Q keyboards can be a good example for the path dependency with technological lockups.

Prof. Dr. Firdevs Güneş, who thinks the F keyboard is are useful for Turkish Language, puts into words:

The world standard Q keyboard is very convenient to write in English and other language. But, F keyboard is a keyboard which was designed for Turkish Language. The letters orientation in F keyboard was completed depending on the Turkish Language structure, using hands and fingers easily. Therefore, F keyboard was organized based on Turkish letters usage frequency rates, the relationship between consonants and vowels, the structures of syllable, word and sentence, the press power of hands, wrists and fingers. According to Turkish sound structure, the most commonly used vowel letters were placed in the middle array and located under the most strengthened fingers. The less used letters were distributed in the other arrays and corners. Because of these features, F keyboard is beneficial as typing Turkish words faster, offering efficiency, keeping attention, better time management, tiring less while typing, making cooperation between hands and brain.<sup>1</sup>

Proffesor Güneş also indicates that in the world computer and fast typing competitions that Turkey participated with F keyboard since 1957, Turkish competitors won 59 world championships including 25 world records. Indeed, according to the results of World Internet Keyboarding Championship, which is organized by International Federation of Information and Communications Processing (Intersteno) in association with the United Nations (UN) in 2014, among the 1679 competitors who are ranking the highest, there are 5 Turkish who became champion, 4 Turkish who became rank 2 and 2 Turkish who became third ranking, as well as this year Turkish competitors won the world championship. With this result, overall world championship score was became 75, that is won in fast typing competitions by Turkish competitors who used the F keyboard.<sup>2</sup>There are some opinions about why Q keyboard is still widely used instead of F keyboard although F keyboard is indicated as the most useful and convenient keyboard for Turkish Language by the experts in this field and using F keyboard not only in our country but also in international competitions makes us more successful.

As also mentioned before, Turkish F keyboard was settled in Turkey in 1970s by the Turkish state policies and it took place of all the typewriters. However, after 1980s our country was introduced to a new Turkish Q keyboard system. Today, almost in all houses there is one or more computer as technological developments increased, computer's and printer's price decreased, internet usage became widely since 1990s. In the meanwhile, the consumers, who did not know about F keyboard which was generally used on the typewriters, bought the computers with Q keyboard system which was recommended by generally the producing firms. When the personal computers were started to sell widely, an American firm IBM added the Turkish letters Ğ, Ş, İ, Ç, Ö, Ü to the right side of the keyboard in the Q keyboard system in order to enter Turkish market easily, then the firm started to sell the slightly changed keyboard system in Turkish market. In this way, IBM easily took an important part in Turkish market share. The same firm, as making more investment, launched an advertisement campaign in TRT Televisions in which the Q keyboard with Turkish letters was shown with the image of "Charlie Chaplin". The keyboard was introduced to the consumers as IBM's Turkish Q

<sup>1</sup> <http://www.hurriyet.com.tr/saglik-yasam/25425260.asp>

<sup>2</sup> <http://www.interstenoturk.org/2014/05/2014-dunya-internet-klavye-sampiyonuyuz/>

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keyboard which can write Turkish words. In this way, other competitor firms started to produce Turkish Q keyboard in order to take more piece of cake in Turkish market share. They also got along with the Turkish Q keyboard system easily. We also need to remember this important fact: In those years, the personal computers were not regarded as taking places of typewriters. The typewriters were still being used with their F keyboard systems with its entire glory. In people's thoughts, computers were regarded as not typing machine but a machine in which one can make fast transactions, in those years. Till yesterday, people were making data entry with the punched card system in large computers, however today we are not using such a system and utilizing much smaller computers. Thus people experienced that they had their own computers in homes in astonishment. Perhaps for this reason, entering Turkish market of Q keyboard was not received as important in those years (Bedir, 2014).

According to one of the first computer scientist in Turkey, retired Prof. Dr. Ümit Karakaş, the leading reason of why Q keyboard was settled in Turkish market faster than F keyboard is during the period of 1960 and 1970, there were computers only at universities, and in those years 2 universities out of 3 which belong to a computer had given education in English Language. By this reason, the people who knew computer also had a strong knowledge of English Language. In those periods, computers were very rare and after 1980s, employees, who worked on the data processing centers at the governmental offices, did not have any problems with Q keyboard system which did not include Turkish letters because many of them knew English Language and their job was held without Turkish letters, easily. In these ways, F keyboard which was widely used in typewriters, was not needed in computers thus in the market a dominant Q keyboard hegemony was created (Karakaş, 2003).

About the fact that F keyboard did not get important share in Turkish market, a manager in International Federation of Information Processing and Communication Directorate of the Turkish Group (InterstenoTürk) Recep Ertaş indicates that Turkish Q keyboard was chosen against F keyboard, because although a preventing and supportive law was added to the Customs Law, employees started to misinterpretation one word in the Custom Law regarding to the keyboard import, and in those period employees and consumers were extremely interested in new products, indifference and unconscious on the past.

As seen clearly, in that period, due to the small historical events which were not taken into account, F keyboard, that was made obligatory national keyboard was not settled in Turkish people's homes as opposed to Q keyboards. It could be given as the most accurate example of F keyboard and Q keyboard rivalry in the subject of technological lockups and the path dependency for our country. It seems that the intervention about keyboard usage was made before 60 years, thus can be done again. According to a notice which was published on Official Gazette on December, 10, 2013; there was a statement that; all computers other than those purchasing process had already been started and will have been supplied since the publication of notice of public institutions and organizations, will presently have national Turkish F keyboard moreover, the conversion of Q keyboard to F keyboard of the presently used computers will have been completed till the end of the year 2017. We will see whether till the end of 2017 the state can achieve the keyboard monopoly, that was not be able to reach sixty years ago.

## 4. Conclusion

At first, I mentioned as a summary of Q keyboard and F keyboard histories in the article in which we analyzed the path dependency through the widely discussed

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article of “Clio and The Economics of Qwerty” published by Paul David in 1985. In my opinion, F keyboard example contributes the path dependency case. According to the various experts’ ideas, the championship records and degrees obtained from the world fast typing competitions which were organized by International institutions and organizations, scientific findings those we did not mention their details; we saw that in Turkish fast typing cases F keyboard is superior over Q keyboard if we compare F keyboard and Q keyboard on typing speed issue. However, F keyboard which was dominantly used in the period of typewriters, after the years of 1980 – 1990 when personal computers started taking places in our homes, F keyboard started losing its importance and superiority over Q keyboard, the built typing system of the personal computers and today F keyboard is almost never used except by the old generation who got used to along with it. Furthermore, the state tried to use its power to interfere the market and to make F keyboard obligatory keyboard in all public institutions and organizations again. We will see whether F keyboard, which was announced that it will be obligatory usage in all public institutions and organization in the year of 2017, will be beaten by Q keyboard as happened before half a century or the state authority, will be successful.

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