Mismatch between Education and Occupation:
A Case Study of Pakistani Graduates

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1. INTRODUCTION

The developed economies especially the US and UK started to invest heavily to expand the supply of graduates before 1980s and Freeman (1976) was the first who raised his concerns over this expansion in his research entitled 'Overeducated Americans'. Since the late 1980s, the research on job mismatch has mushroomed in the US as well as in other developed countries.

The initial studies perceived the education-job mismatch as a temporary phenomenon [Freeman (1976)]; however, later the empirics did not support it. The empirical text in various developed regions has mainly focused the 'over-education'[1] which range from 10 percent to 40 percent in various developed countries [Groot and Maassen (2000a)]. These estimates raised serious questions over the validity of conventional views of the labour market; consequently a good debate has started with the emergence of some new theories i.e., the job competition theory and the job assignment theory in which the institutional rigidities, allocation problems and skill heterogeneities were dealt.

Both economists and sociologists have consigned the job mismatch phenomenon as a serious efficiency concern with its pertinent socio-economic costs at individual, firm and national level. At individual level, it would let down the individual's marginal product, though the estimated wage differential differs across the countries.[2] The lower returns to education may also incur some non-transitory costs i.e. lower level of job satisfaction, frustration and higher turnover rate. At the firm level, job mismatch is associated with lower productivity and lower level of job involvement; and in case of

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[1]Over-education explains the extent to which a worker possesses a level of education in excess of that which is required for a particular job.

[2]For UK, 12 percent by Dolton and Vignoles (2000), 18 percent by Dolton and Silles (2003), 23.2 percent by Chevalier and Lindley (2006). For US, 13 percent by Verdugo and Verdugo (1989), 11 percent by Cohn and Khan (1995). For Holland, 26 percent by Groot (1993), 8 percent in Kiker, *et al.* (1997) for Portugal and 27 percent in Budría and Edigo (2007) for Spain.

high turnover rates, firms may have to prevail with extra costs on screening, recruiting and training [Tsang (1987); Sloane, *et al.* (1999)]. At the macro level, the national welfare in terms of monetary welfare and non-monetary would be lowered by under-utilisation of skills [McGuinnes (2006)]. It is also possible that previously well-matched graduates in the economy will be 'bumped down' in the labour market as over-educated workers move into lower occupations thus raising the educational requirements within these occupations [Battu, *et al.* (2000)]. Thus, the rapid educational expansionary policies may not yield the desired real economic benefits [Budria and Egido (2007)].

The subsequent section shows that no study on job mismatch exists in Pakistan; however, Pakistan is also facing this dilemma. Keeping in view the importance for researchers and policy-makers in Pakistan, the present study aims to contribute in knowledge by analysing the incidences of the various types of job mismatches among Pakistani graduates. The rest of the study is organised as follows. Section 2 presents a review of potential presence of job mismatch in Pakistan, followed by measurement issues, theoretical and empirical literature in Section 3. A discussion on data sources and methodology is given in Section 4. The results over the incidences of job mismatch are presented in Sections 5, followed by conclusion and policy considerations in final section.

2. POTENTIAL OF JOB MISMATCH IN PAKISTAN

In Pakistan, no direct study on job mismatch has been prepared; however, there exist awareness about this issue.[3] A variety of barriers including the poor level of information about job opportunities, institutional barriers, geographical barriers, race or gender etc., are causing the job mismatch. Various socio-demographic characteristics and customs are also regarded as a constraint to female's labour market participation [Nazli (2004)]. The gender gap is still high with skewed distribution in terms of economic sector and status [Pakistan (2007b)].

Despite the recent socio-economic developments, the educational system in Pakistan is not coping with the right demand of labour market by mainly imparting education in conventional subjects. Educational policies have been suffered from frequent political undulations and the educational system with outdated curricula is draining the human capital accumulation when Pakistan is hardly investing only 2 percent of its GDP on education [Pasha (1995); Nasir (1999)]. At school and college level, the educational system follows variety of tiers [Haq, *et al.* (2007)]. During 2001-2008 periods, the rapid expansion at the higher education has raised the participation especially among female graduates,[4] while heterogeneity of skills across the regions and institutes also rose. The return to education has a declining trend in Pakistan, implies that the country has failed to produce high demand for education [Qayyum, *et al.* (2007)].

Despite rising labour force, the unemployment rates also remained high in the range of 6–10 percent during 2001-10 periods, suggesting that employment generation has not kept pace with the labour force. Meanwhile, quality of jobs and the access to modest earning opportunities still remained an issue. As shown in Table 1, the educated unemployment (matric and above) has increased during FY00 and FY06. It could

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[3]Statistics from various rounds of Labour Force Survey, Pakistan (2007a, 2007b, 2008a, 2008b).

[4]In 1947, there were only two universities which jumped up to 54 in 1999 and 132 at present.

Table 1

Educational Attainment of the Unemployed (Age 15+) (%)

Education Level	FY00	FY02	FY04	FY06	Change b/w FY00 and FY06 (Percentage Point)
Illiterate and Pre-primary	47.7	45.7	42.3	44.7	−3.0
Primary and Middle	28.6	27.4	25.8	26.1	−2.5
Matric and Intermediate Education					
Overall	19.3	21.2	24.8	22.4	+3.1
Male	23.2	23.7	28.8	26.1	+2.9
Female	12.2	15.7	15.7	14.3	+2.1
Degree Level Education					
Overall	4.3	5.8	7.2	6.8	+2.5
Male	5	6.4	7.1	6.9	+1.9
Female	2.9	4.4	7.3	6.6	+3.7

Source: Pakistan (2007a).

indicate the poor choice of educational fields [Pakistan (2007b)]. With rising employment participation, the labour market imperfections and imbalances have also rose; with rising job search periods, rising share of informal sector, lower productivity and high risk of vulnerability especially for youth and female [Pakistan (2007a, 2007b, 2008b)].[5] The market is skewed toward influential peoples where job opportunities are predominately reference-oriented rather than skill oriented.

Keeping in view this importance, the on-going study would provide the information on job mismatch and would lay foundation for further detailed studies. It would also help the educational and labour policy-makers to make better decisions especially for the youth which is the greatest asset of Pakistan.

3. DEFINITION, THEORETICAL FOUNDATIONS AND EMPIRICAL REVIEW ON JOB MISMATCH

3.1. Definition and Measurement Issues of Job Mismatch

The phenomenon of job mismatch can be viewed in three dimensions; education-job mismatch, qualification-job mismatch and field of study and job mismatch. Education-job mismatch compares the acquired education by a worker with that required by his/her current job. The empirical work so far has relied on three main methods to measure the required education for education-job mismatch. The first method pertains to 'Job analysts (JA) Method' (*objective approach*), in which the professional job analysts grade the jobs and recommend the minimum educational requirements for a certain job/occupation [Haratog (2000); Battu, *et al.* (2000)]. The second method refers to 'Self-assessment method' (*subjective approach*), where workers are asked directly to give information on the minimum educational requirements for their current job [Sicherman

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[5]60.6 percent were considered vulnerable, meaning "at risk of lacking decent work" in 2006-2007 [Pakistan (2007a)].

(1991); Alba (1993)]. The third 'Realised match (RM)' method was found by Verdugo and Verdugo (1989) that measure the degree of education-job mismatch by two variables; years of schooling and occupational group of a job holder. The distribution of education is calculated for each occupation; employees who depart from the mean by more than some *ad-hoc* value (generally one) standard deviation are classified as mismatched workers [Verdugo and Verdugo (1989); Kiker, *et al.* (1997) and NG (2001)].

Qualification is a broad signal of human capital competences because it assimilates the other constituents of human capital (skills, experience) and also the formal education. Educated workers can compensate their skill deficiencies by additional training and learning during their jobs; therefore, the formal education is the part of overall qualification [Ishikawa and Ryan (2002); Neumark and Wascher (2003)]. The attained qualification possessed by the workers, may be lower or higher than the required qualification in their perspective jobs. When this happens, the worker is said to be mismatched in qualification. The two measurement approaches of qualification mismatch have been emerged from the literature; the first, the overall qualification approach (*subjective approach*) is based on worker's perception [Green and McIntosh (2002); Lourdes, *et al.* (2005)], while the second, the specific approach is based by measuring the various specific attained skills possessed by the workers and the required skills in their current job as Lourdes, *et al.* (2005), Jim and Egbert (2005) and Chevalier and Lindley (2006) did.

The field of study and job mismatch analyses the level of match between the individual's field of study and his/her contents of job. The existing three studies have adopted both subjective and education-occupation combination to measure the field of study and job mismatch [Jim and Robert (2004); Robst (2007) and Martin, *et al.* (2008)].

The validity and choice of various measures of education-job mismatch depend on data availability with limitations as well [Leuven and Oosterbeek (2011)]. The JA approach ignores the ability and possible deviation of job levels within a given occupation within same occupational titles [Halaby (1994); Dolton and Siles (2003)]. Second, the required level might change due to new technologies or reforms of workplace organisations [McGuiness (2006)]. Third, the categories of training requirements must be translated into equivalent years of schooling with some consensus [Rumberger (1987)].

The 'subjective' measure might overestimate and/or underestimate the job mismatch in the presence of qualification inflation. Workers in less structured organisations may not always have a good insight about the required level [Cohn and Khan (1995); McGuiness (2006)]. Respondents may also apply different criteria for job requirements, i.e., the actual level of education required to do specific tasks or the formal educational requirements necessary to get the job. However, Green, *et al.* (2002) found that in majority cases, the assessment of education levels needed to do the job tended to match those needed to get the job, suggesting consistency between two subjective approaches.

The third method, the realised method is very sensitive to labour market changes and for cohort analysis. In case of excess supply, it will underestimate the level of over-education and will overestimate in case of excess demand [Kiker, *et al.* (1997); Mendes *et al.* (2000)]. Therefore, the method based on realised matches is the least adequate one for determining over-education and under-education [Chevalier (2003); McGuiness (2006)].

Both the JA and RM measure imply that all the jobs within the same occupational titles require identical skills. These assumptions are obviously naive in those occupations where workers are hired for flexible tasks [Groot (1996)]. Chevalier (2003) argued that widening access to higher education has increased the heterogeneity of skills; whereas, Green, *et al.* (2002) highlighted the potential heterogeneity effects that may arise because of grade drift in UK.[6]

Some studies have measured the level of consistency between different measures of education-job mismatch. Battu, *et al.* (2000) analysed the consistency between WSA and JA measures on panel datasets (1985 and 1990) and found high correlation for females between the two. Jim and Velden (2001), Green and McIntosh (2002) and Lourdes, *et al.* (2005) found the poor correlation between the education-job mismatch and qualification-job mismatch. It is worth noting that the choice of definition has a large effect on the incidence of education-job mismatch. As reported few studies in appendix table 1, majority of the studies have used the job analyst and self-assessment approach and found mixed findings. In some studies, the incidences of education-job mismatch are in close [Battu, *et al.* (2000); Dieter and Omey (2006, 2009)]; whereas, a lot of inconsistency exists in some studies [Hersch (1995); Chevalier (2003)].

3.2. Theoretical Foundations of Job Mismatch

A significant segment of literature on job mismatch considers how this phenomenon be positioned within the context of existing views of labour market; however, there is no unified accepted theory on education-job mismatch.

According to Human Capital Theory (HCT), wages and productivity are fixed in relation to prospective jobs; therefore, over-educated workers have same productivity and thus receive the same wages as compared to those who are on matched jobs [Schultz (1962); Becker (1964)]. The education-job mismatch phenomenon may not necessarily reject the HCT in case of short run existence; however, if it appears to be a long run phenomenon, then no one can save the HCT [McGuiness (2006)]. The opponents of HCT argue that it fails to explain the underutilisation of skills, institutional rigidities and non-competitive labour market [Carnoy (1994)]. Tsang (1987) suggested that the relationship between education and productivity is more multifaceted than the direct and positive relationship as suggested by HCT. World Bank (1999) in "Knowledge for Development" pointed that the private rate of return to higher education was similar to that for secondary schooling. Psacharopoulos and Patrinos (2002) reviewed 98 countries for the period 1960 to 1997 and concluded that higher education gives less return than that on secondary schooling. In Pakistan, Faheem (2008) shows that rate of return for MPhil and a PhD degree is less than that for a master and a professional bachelor degree.

In contrast to HCT, the Job Competition Theory (JCT) highlights the institutional rigidities where marginal products and consequently earnings are associated with job characteristics, and not by individual characteristics [Thurow (1975)]. The allocation on job is based on available supplies of both workers and jobs, workers may possess more education and skills than their jobs necessitate. In the extreme, education simply serves to

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[6]Grade drift is drop in quality of education. It will be evident if employers are found to be increasing educational requirements for younger workers. The concept of grade drift is related to heterogeneity as individuals with similar education potentially have significantly different ability levels [McGuiness (2006)].

obtain the job, and there is a zero return to human capital beyond that required to do the job, as all workers in a given job are paid the same wage. Therefore, Mincer model (1974) and the Thurow's model (1975) are two extreme cases, being the first purely supply side driven and the second purely demand side driven.

A third strand of the literature is based on the Assignment Theory [Sattinger (1993)] which asserts that there is an allocation problem in assigning heterogeneous workers to jobs which differ in their complexity. Where the frequency distributions on the demand and supply side are unlikely to match and education mismatches may be a persistent problem if the job structure is relatively unresponsive to changes in relative supplies of educated labour. The majority of studies on education-job mismatch have supported the job assignment theory by rejecting both the HCT and the JCT.[7]

According to the Theory of Occupational Mobility, individuals may choose a lower entry level than those in other feasible entry levels with the higher probability of promotion [Sicherman and Galor (1990)]. According to Job Screening Model, education is used as a signal to identify more able and productive workers when labour market is not perfect [Spence (1973)]. Workers, therefore, invest more on education in order to provide good signals with the hope that it will permit them to be distinguished from other job applicants. The Matching Theory assumes that labour market is not opaque [Rosen (1972); Jovanovic (1979)]. The search cost exists to find a perfect match. Therefore, both employees and employer might have a mutual incentive to agree on a non-optimal match. However, overtime, workers are expected to obtain an improved job.

Some other explanations have also been put forward which appear to be largely unrelated to any major theoretical framework. Theory of differential over-qualification explains the higher probability of being over-education among married women in lesser labour market [Frank (1978)]. McGoldrick and Robst (1996) and Buchel and Ham (2003) suggest that ethnic minorities are likely to be more severely affected. Robest (1995) notes, "those who attend the lowest quality schools may be over-educated throughout their career. Those who attend a better school may be able to work their way upward during their career." Battu, *et al.* (1999) and Dolton and Silles (2001) found a positive influence of regional mobility on the quality of the match while Piracha and Vadean (2012) found higher over-education among the immigrants. Green and McIntosh (2002) argued that if the quality of education falls, this too may encourage employers to upgrade the educational requirements of job, referred as grade drift.

3.3. The Empirical Literature on Job Mismatch

As noted earlier, the wave of supply of fresh graduates in the U.S. triggered first research on education-job mismatch in 1970s. According to Freeman (1976), the excessive number of graduates would trim the return on education, resulting lower investment on higher education. However, his prediction has never materialised in US and in other developed countries. Similarly, in U.K., the over-education ranges from 29 percent to 47 percent with stable rate of return from 1978 to 1996 [Green, *et al.* (2002)]. Through cohort analysis of UK graduates, Dolton and Vignoles (2000) found that 62 percent of the male graduates, who were over-educated in their first job, remained in a

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[7]Alba (1993); Groot (1996); Kiker, *et al.* (1997); Sloane, *et al.* (1999); Dolton and Silles (2001); Kler (2005); Chevalier and Lindley (2006); Martin, *et al.* (2008), etc.

sub-graduate position six years after graduation. Despite the increased mobility of over-educated workers, Sloane, *et al*. (1999) found that 40 percent of the graduates were over-educated six years after graduating using survey carried out by the University of Birmingham. Further, the author concludes that the quality of the match not improves with the change of employer.

A number of studies in the developed countries have documented the extent of education-job mismatch. Describing the results very broadly, about a quarter to a third of a nation's employees tend to work in jobs for which they are over-educated, with a somewhat smaller proportion working in jobs for which the required education level exceeds their actual education [Battu, *et al.* (1999); Dolton and Vignoles (2000); and Green, *et al.* (2002)]. Groot and Maassen (2000a) and McGuiness (2006) have catalogued these studies on the basis of methodology used. For job analyst measure, the incidences of over-education range between 11 percent and 40 percent, and under-education between 20 percent and 44 percent. Appendix Table 2 also summarises a number of empirical studies conducted in different developed countries

The literature specifically on qualification mismatch is scarce as existing studies mainly has used the formal education as a substitute of qualification as Hersch (1995), Groot (1996), Battu, *et al.* (1999), Ng (2001), and Frenette (2004) did. A few studies, however, has measured the qualification mismatch conducted by Lourdes, *et al.* (2005) in Spain, Jim, and Egbert (2005) in five developed countries (Spain, Germany, UK, the Netherlands and Japan) and Brynin, *et al.* (2006) in four European countries (Britain, Italy, Germany and Norway).

Few studies have so far been conducted on the field of study and job mismatch. The pioneer research by Robst (2007) in US has estimated the field of study and job mismatch by subjective approach and found that 28 percent of men and 21 percent of women have somewhat related and 19 percent of men and 21 percent of women have complete mismatch between field of study and occupation. In Sweden, Martin, *et al.* (2008) used the various datasets (Swedish Register of Education, Enlistment data from Pliktverket, National Tax Board) and found that 23 percent of men and 19 percent of women are matched, while 16 percent of men and 10 percent of women are weakly matched. Using the data of five countries (Spain, Germany, UK, the Netherlands and Japan), Jim and Egbert (2005) have found that 6 percent of the employees in Spain, 10.4 percent in Germany, 11.1 percent in Netherlands, 18.6 percent in UK and 24.2 percent in Japan were on jobs with matched education but mismatched in field of study.

4. METHODOLOGICAL FRAMEWORK AND DATA DESCRIPTION

4.1. Data Description

The present study has used both the secondary and primary datasets by targeting the employed graduates working in the formal sector who hold fourteen and above year education, named as 'employed graduates'. The rational to choose the graduates and above employees is that the job mismatch phenomenon persists usually at the higher education level. Regarding the secondary dataset, this study has used the two Labour Force Survey (LFS) carried out in 2006-07 and 2008-09. The LFS, 2006-07 comprises of 2,839 employed graduates, while the LFS 2008-09 comprises of 3,896 employed graduates. Across the gender, about 84-85 percent are males while the rests are females in both LFS datasets.

Keeping in view the data limitations in secondary dataset, the primary survey, the Survey of Employed Graduates (SEG) has been conducted in early 2010 in two major cities of Pakistan, Islamabad and Rawalpindi to study the job mismatch phenomenon in depth. It would be more enviable if such study has been conducted at national level; however, time constraints and financial constraints were the most difficult impediment.

At broad level, the targeted universe in the SEG dataset has been divided into the three major groups; graduates in federal government, graduates in autonomous/semi-autonomous bodies under federal government and graduates in the private sector. Table 2 shows the estimated targeted population in the SEG dataset which is 100,386 employed graduates. The Thirteenth Census Report of Federal Government Civil Servants (2003-04) and Annual Statistical Bulletin of Federal Government and Semi-government (2007-08) were used to estimate the graduate employees in the federal government and semi-government. For private sector, the relevant information were gathered from the few private departments i.e. banks, hotels, telecom companies, international donor offices, media (newspaper and broadcasting) from their documented record. For the remaining private sector like hospitals, educational institutions, NGOs, manufacturing and Industry etc, the internet and the other sources were used to know the total numbers of units located in Islamabad/Rawalpindi and then through rapid sample survey, the information were obtained to estimate the employed graduates.

Table 2

Estimated Graduate Employees in SEG Dataset

Sector	Total	Male	Female
Government Sector	25,828	22,389	3,439
Semi-government Sector	38,424	35,535	2,889
Private Sector	36,134	28,317	7,817
Total	100,386	86,241	14,145

To avoid the sampling bias and errors, the proportional stratified random sampling technique was adopted where the published BPS grades for the government and semi-government sectors have been considered as 'strata' while the 3-digit occupational codes were used as 'strata' for the private sector. Figure 1 shows the distribution of complete sample of 514 graduates across the three major groups according to their relative employment share. All the questionnaires have been conducted by face-to-face interviews.
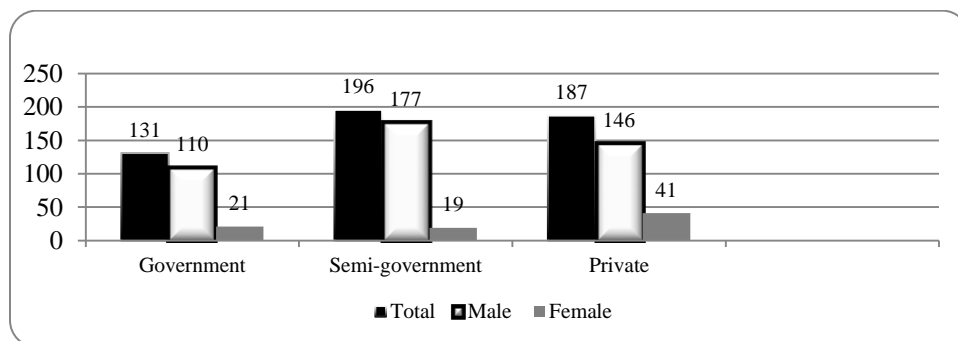
Fig. 1. Sector-wise Sample Distribution

4.2. The Methodological Framework for the Estimation of Job Mismatch

4.2.1. *The Measurement of Education-Job Mismatch*

As discussed in Section 3, the empirical work has relied on three main methods to measure the degree of education-job mismatch which are job analyst (JA) method, worker self-assessment (WSA) method and realised match (RM) method. As the present study has used both the secondary and primary datasets; the secondary dataset (LFS 2006-07, 2008-09) fulfil the requirement of only RM measure. However, the education-job mismatch in this study has been estimated by all the three measures (JA, WSA, and RM) on the basis of SEG dataset.

If E is the actual number of year of education and E^r is number of years of education required for a job, thus over-education (E^o) is represented by;

$$E^o = 1 \quad \text{if} \quad E > E^r \quad \text{and} \quad ... \qquad ... \qquad ... \qquad ... \qquad ... \qquad ... \qquad (1)$$

$$E^o = 0 \qquad\qquad \text{otherwise}$$

Similarly, under-education (E^{ut}) is determined as;

$$E^{ut} = 1 \quad \text{if} \quad E^r > E \quad \text{and} \quad ... \qquad ... \qquad ... \qquad ... \qquad ... \qquad ... \qquad (2)$$

$$E^{ut} = 0 \qquad \text{otherwise}$$

If E^{rj} is the estimated required education level by JA measure and the E^{rs} is estimated required level by WSA measure, then qualification inflation (QI) can be measured as;

$$QI = E^{rj} - E^{rs} \qquad ... \qquad ... \qquad ... \qquad ... \qquad ... \qquad ... \qquad ... \qquad (3)$$

A positive value of QI indicates the qualification inflation which means that due to excess supply, the employer has raised the required education level [Green, *et al.* (2002)].

To capture the issues of skill heterogeneity among over-educated graduates, we relax the assumption that graduates with same education level are perfect substitutes and hypothesise that graduates with same education may not be same in their skill endowment. This assumption would also capture the widening access of education at higher level in Pakistan which has increased the heterogeneity of the skills among the fresh graduates. Following Chevalier (2003), a measure of education-job mismatch and occupation-satisfaction has been adopted to capture the idiosyncratic characteristics by segregating the over-educated graduates into two categories; those over-educated graduates who are satisfied over their mismatch are defined as *apparently* over-educated (E^{oa}), whereas those who are dissatisfied are *genuinely* over-educated (E^{og}).[8]

4.2.2. *The Measurement of Qualification Mismatch*

The qualification mismatch can be assessed by comparing the attained qualification/competences and required qualification/competences by each worker and workers are typically classified into over-qualified, under-qualified, and

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[8]Job satisfaction has been measure at five point likert scale range from very dissatisfied to very satisfied. For *apparent* over-educated workers, range 1 (very dissatisfied) and range 2 (dissatisfied) was used while for *genuine* over-educated workers range 3 to 5 has been used.

adequately qualified. Unlike to existing subjective methodologies as adopted by Green and McIntosh (2002) and Lourdes, *et al.* (2005) this study has followed the specific approach where initially, the level of nine specific attained and required skills has been estimated in SEG survey on five-point scale, ranging from 1 'not at all' to 5 'a lot'. Through Principal Component Analysis (PCA) method, the weights has been estimated on attained skills and required skills on the basis of mean required level of nine skills by assuming that the workers in same occupations at two-digit occupational coding require the similar types of skills in their jobs. The qualification mismatch has been estimated by comparing the attained skill index and required skill index with (+/−) 0.08 standard deviation (SD) of the mean (0.075 SD for SEG weights).[9]

4.2.3. *The Measurement of Field of Study and Job Mismatch*

One of the most significant type of mismatch in Pakistan, the field of study and job mismatch analyses the level of match between the individual's field of studied discipline and his/her contents of job. Since, no nationally representative dataset of Pakistan provides the information about the field of study and job mismatch; therefore, the field of study and job mismatch has been estimated in SEG dataset by subjective approach with the question: *'how much your current job is relevant to your areas of education?'* The four possible options were; irrelevant field of study, slightly relevant, moderately relevant and completely relevant field of study.

5. THE INCIDENCES OF JOB MISMATCH

5.1. The Incidence of Education-Job Mismatch

Table 3 presents data on the incidence of education-job mismatch by applying the three methods (JA, WSA and RM) on the SEG dataset and the sampled graduates have been classified into three categories; over-educated, under-educated and matched graduates. The LFS datasets by RM measure shows that 30-31 percent of the graduates are mismatched at the national level with the rising incidences of over-education and the falling incidences of under-education between 2006-07 and 2008-09. In both rounds, the female graduates are facing more education-job mismatch than males with more over-education among females and more under-education among males (Table 3).

Regarding the SEG dataset, the estimates show that the incidence of education-job mismatch varies by the three measures (Table 3). First take the case of over-education; it is 15 percent under RM measure, 25 percent under WSA measure and 26 percent under JA measure. Both the WSA and JA show the level of over-education in close as compared to RM measure. The incidence of under-education ranges from 4.5 percent under JA criteria, 10 percent under WSA and to 22 percent under RM approach. Again, the JA and WSA yield lower results than the RM approach.

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[9]Standard deviation has been calculated after comparing the both attained and required skill index.

Table 3

The Level of Education-Job Mismatch by Various Approaches (%)

Datasets	Measures	Matched	Under-education	Over-education	N
RM Method on LFS 2006-07	Female	65.7	4.4	30.0	457
	Male	69.4	9.7	20.9	2,382
	Total	68.8	8.9	22.3	2,839
RM Method on LFS 2008-09	Female	60.5	4.2	35.4	577
	Male	71.2	2.3	26.6	3,319
	Total	69.6	2.5	27.9	3,896
SEG, 2010	WSA Method	65.4	9.9	24.7	514
	JA Method	69.5	4.5	26.1	514
	RM Method	63.4	21.6	15.0	514

The close estimates of over-education by WSA and JA approach suggest that graduates have not overstated or understated the educational requirements. It is the pioneer study in a developing country; therefore, it may not be desirable to compare the incidences of education-job mismatch to studies conducted in the developed countries. However, estimates of this study are consistent with the earlier findings that RM method reports the lower incidence of over-education as compared to the WSA and JA methods [Meta-analysis of Groot and Maassen (2000a) and reviewed study by McGuinnes (2006)].

Though it is not rational to compare the LFS dataset with the SEG dataset; however, the higher incidence of under-education in SEG while the lower incidence in LFS through RM measure reflects the excess supply of graduates in the SEG dataset which has overestimated the level of under-education and underestimated the level of over-education in SEG dataset. Similarly, the higher incidence of under-education and lower incidence of over-education also indicate variation in educational distribution within the occupations which, in case of structural changes usually overestimate the required level of education as suggested by earlier studies [McGuiness (2006)].

While dividing the over-educated workers into '*apparent over-educated*' and '*genuine over-educated*', Table 4 shows that under WSA and JA approaches, about 57 to 63 percent of the over-educated respondents in non-graduate jobs are not too dissatisfied with their mismatch, therefore, they are defined as *apparently* over-educated graduates and the rest (37 percent to 43 percent) who are dissatisfied, are defined as *genuinely* over-educated graduates. These results are consistent to the earlier studies which has captured the issue of heterogeneity [Chevalier (2003); Chevalier and Lindley (2006)].

Table 4

The Level of Genuine and Apparent Over-education (%)

Education-Job Mismatch	WSA Approach	JA Approach	RM Approach
Matched	65.4	69.5	63.4
Under-educated	9.9	4.5	21.6
Genuine Over-educated	10.7	9.7	4.7
Apparent Over-educated	14.0	16.3	10.3

In a flexible labour market, the majority of workers should have suitable education for their jobs where the job mismatch just explains the searching and matching situation [Borghans and Grip (2000)]. However, in Pakistan, the labour market is not flexible; the structural mismatch may exist also. Assuming that the JA and WSA truly measure the education-job mismatch, the respondents who are mismatched on the basis of JA, WSA, or RM are called frictional mismatched graduates, while who are mismatched on the basis of JA and WSA only are called structural mismatched graduates [Dieter and Omey (2006)]. Table 5 shows that over-education is mainly a structural phenomenon as it is about 16 percent, while frictional over-education ranges from 9 percent to 10 percent. However; under-education is a frictional phenomenon as it is more than structural under-education with a range from 4 percent to 8 percent. The structural over-education reflects that the education-job mismatch may not be a temporary phenomenon in Pakistan.

Table 5

The Level of Frictional and Structural Mismatch (% of total)

Type of Mismatch	Frictional Mismatch		Structural Mismatch	
	JA and RM	WSA and RM	JA and RM	WSA and RM
Under-educated	4.3	7.8	0.2	2.1
Over-educated	10.3	8.8	15.8	16.0

Contrary to existing empirical text [Pollet, *et al.* (1999); Dieter and Omey (2006)], the results of SEG dataset show higher level of qualification deflation (13 percent) than the qualification inflation (8 percent) in Pakistan where employees are reporting a higher educational requirement than the employer's requirement level. This points to the occurrence of up-gradation of educational requirements in the private sector in lower occupations as well as the need of revising the contents of jobs especially the professional jobs in the government sector.

To check out the significance of differences between JA, WSA and RM estimates on the required level of education, the parametric t-test shows that two theoretic build methods, the JA and WSA are consistent over the required level of education for a particular job; however, the third statistical method (RM) significantly differ over the measurement of required level of education as compared to the both WSA and JA measures. Regarding the estimation of education-job mismatch, there exist poor correlation between RM and JA (0.25), again a poor correlation between RM and WSA (0.26), while the high correlation between the JA and WSA (0.64) measure.

5.2. The Incidence of Qualification Mismatch

The representative datasets of the Pakistan labour market are unable to provide the relevant information regarding the attained and required skills of job holders; therefore, this study has measured the qualification mismatch from the SEG 2010 dataset. As discussed earlier, the nine skills possessed by the graduates and required in their current job have been measured at 5 point-likert scale and weights have been assigned to each attained and required skills on the basis of demanded skills. Taking the difference of attained and required skill index, the qualification mismatch has been measured after calculating the zero mean and 0.08 standard deviation and the results have been reported in Table 6 which shows that more than

one-fourth of the graduates are mismatched in qualification either in terms of over-qualification or in terms of under-qualification. The phenomenon of 'matched graduates' is considerably higher among males (73 percent—74 percent) than among females (67 percent). A lesser proportion of female graduates are under-qualified (11 percent) as compared to the male graduates (13 percent—14 percent); however, there are more over-qualified female graduates (22 percent) as compared to the male graduates (12.7 percent—13.4 percent). It reflects the scenario of relatively more under-utilisation of females' skills in their jobs probably because of the concentration of female graduates in the lower occupations.

Table 6

The Distribution of Respondents by the Level of Qualification Mismatch (%)

	Matched Graduates	Under-qualified	Over-qualified
Weights Estimated by PCA			
Female	66.7	11.1	22.2
Male	72.8	13.9	13.4
Total	71.8	13.4	14.8

A recent debate exists whether the formal education should be used as a proxy of qualification or not. Green and McIntosh (2002) found a moderate correlation between over-education and over-qualification; whereas no relationship could be found between under-education and under-qualification. The majority of studies found poor correlation between the two by arguing that education and qualification mismatch are different aspects with respect to incidence and their consequences on the labour market [Jim and Egbert (2005); Lourdes, *et al.* (2005)]. Table 7 reports the marginal and joint distribution with poor level of association between education-job mismatch and qualification mismatch. Under the JA criteria by education-job mismatch, 59 percent of the graduate workers are consistent to qualification criteria also; whereas, under WSA criteria, 57 percent of the graduates are rightly classified to both education and qualification mismatch.

Table 7

Marginal and Joint Distribution of Education and Qualification Match (%)

	Matched	Under-qualified	Over-qualified	Education Match
Job Analyst Method (JA)				
Matched	52.0	10.3	7.2	69.5
Under-educated	3.5	0.4	0.6	4.5
Over-educated	16.3	2.7	7.0	26.1
Qualification Match	71.8	13.4	14.8	100
Worker Self Assessment Method (WSA)				
Matched	48.8	9.0	7.6	65.4
Under-educated	6.8	2.1	1.0	9.9
Over-educated	16.2	2.3	6.2	24.7
Qualification Match	71.8	13.4	14.8	100

To go one step further, the statistical association between education-job mismatch and qualification mismatch has been checked by non-parametric tests. Both the Spearman and Kendall tau rank correlation coefficients in Table 8 show the lower level of correlation between the two measures of education-job mismatch and qualification mismatch. Regarding the Kruskal Wallis Rank test, the estimated Chi-square tie values also show the poor association between the qualification mismatch and education-job mismatch, as the calculated values of Chi-square are less than the tabulated values (124.3 at 5 percent), thus supporting the null hypothesis that a significant difference exists between the education-job mismatch and qualification mismatch.

Table 8

The Level of Association between Education and Qualification Mismatch

	Qualification Mismatch			
	Spearman Correlation	Kendall tau rank Correlation		Kruskal Wallis
Education Mismatch	Coefficients	tau-a	tau-b	Chi-squared ties
JA	0.13	0.06	0.13	10.88
WSA	0.11	0.05	0.10	6.20

5.2. The Incidence of Field of Study and Job Mismatch

The existing studies on field of study and job mismatch, carried out in the US and Sweden have used the national survey datasets which provided them detailed information about the relevance of field of study to the contents of current job [Robst (2007); Martin, *et al.* (2008)]. But, the national datasets in Pakistan have no such information about this type of job mismatch. Following, Jim and Robert (2004) and Robst (2007), this study has measured the field of study and job mismatch by subjective approach from SEG 2010 dataset. Table 9 shows that 11 percent of the graduates consider that their current jobs are totally irrelevant to their studied field of discipline, while another 14 percent reported their jobs are slightly relevant, followed by the moderate relevant with 38 percent and complete relevant with 37 percent. An important information is that the female graduates are facing more field of study and job mismatch than the male graduates as one-third of the female graduates are mismatched either with irrelevant or weak relevant category; however, less than one-fourth of the male graduates are falling in these first two categories (Table 9).

Table 9

The % Distribution of the Respondents by Field of Study and Job Mismatch

Level of Mismatch	Female	Male	Total
Irrelevant	14.8	10.6	11.3
Slightly Relevant	18.5	12.9	13.8
Moderately Relevant	33.3	39.3	38.3
Completely Relevant	33.3	37.2	36.6

6. CONCLUSIONS AND POLICY IMPLICATIONS

The main focus of this study is to estimate the three types of job mismatch and the analysing the determinants of job mismatch. About one-third of the graduates are mismatched either in over-education or in under-education category. The over-educated graduates are further classified into *'apparent* over-educated *and 'genuine* over-educated categories. Approximately 60 percent of the graduates are in the former category while the rests are in later category. More than one-fourth of the graduates are mismatched in qualification; about half of them are over-qualified and the half are under-qualified. More than one-tenth of the graduates consider that their current jobs are totally irrelevant to their studied field of discipline, while 14 percent of the sampled graduates reported that their jobs are slightly relevant to the field of study. The female graduates are facing more field of study and job mismatch than the male graduates.

Overall, the incidences of job mismatch do not support the Human Capital Theory [Becker (1964); Schultz (1962)] which assumed the competitive labour market and in a pure human capital framework, the concept of job mismatch may be meaningless when wages are linked with the productivity. However, this study cannot necessarily reject the Human Capital Theory on the basis of cross-sectional dataset as the mismatch phenomenon might be temporary. Similarly, more qualification mismatch among female graduates support the theory of differential over-qualification. Additional research is required with a dynamic perspective to explore its length and the societal losses as well. In the present analysis, the incidences of job mismatch do not mean that the level of education should be lowered: it rather suggests the need for more quality of education and skills as well as reforms in the labour market. Our findings lead to the following policy implications and recommendations primarily in two areas; reforms in human resource development and labour market institutions;

- The phenomenon of job mismatch highlights the weak coordination among various demand and supply side stakeholders. A close coordination among these is prerequisite for better understanding of issues in order to formulate the right policies.
- The estimates of over-education and under-qualification suggest that the educational system is either providing inadequate skills or creating more graduates in those disciplines which have relatively less demanded in the labour market. A sound occupational-specific education would ensure the matching jobs. There is a need to strengthen the vocational education and training (TVET) policies at the province and district levels.
- The statistics of under-qualification and qualification inflation highlights that the education system is not coping with right demands of the labour market. There is a need to conduct some tracer type studies and/or occupational census (GED and DOT in US, SOC in UK, ARBI in Netherlands) to understand the employment patterns and skills demanded by the various sectors and occupations. It would not only guide the planners and enrolled youth about the labour market opportunities and type of skill needed, but also would help to project future educational needs.

- For females, the rapid rising enrolment with limited participation in the labour market and more job mismatch issues suggest to address the socio-cultural constraints and labour market discriminations. There is a need of policies and programs which would not only breach the 'glass wall' and 'glass ceiling' barriers, but also provide them the entrepreneur's opportunities and caretaking skills.

- The estimates of job mismatch, especially the field of study and job mismatch highlights the labour market rigidities and imperfections. There is a need to design and promote policies which would ensure the six dimensions of decent work; opportunities of work, conditions of freedom, productive work, equity in work, security at work and dignity at work. The 'merit' norms and equal job opportunities should be ensured for the various segments of the society. There is a need of strategies and programmes to improve the social relations between the employers and employees to raise the level of job satisfaction and productivity. Further, the macroeconomic policies i.e. fiscal, monetary and trade policies can also be used to achieve the decent work objectives.

- The existing labour market information system is inadequate. It mainly depends on the Labour Force Survey (LFS) which is not sufficient to provide up-to-date and adequate information to job seekers. There is a need to improve the LFS questionnaire for skill assessment, labour market opportunities and job mismatches. A module about the history of employment may also be made part of the LFS.

Appendix Table 1

A Reviewed Summary of Incidence of Education-Job Mismatch with
Variation in Estimates by Various Approaches

Author(s)	Country	Type of Definition	Estimated Results of Education-Job Mismatch
Hartog and Oosterbeek (1988)	Netherlands	Job Analyst Subjective (WSA)	**JA:** 7% OE, 35.6% UE for 1960; 13.6% OE, UE 27.1% UE for 1971 **WSA:** 17% OE, 30% UE for 1974
Hersch (1995)	US	Subjective and Job Analyst	**WSA:** 29% OE, 13% UE; **JA :** 33% OE, 20% UE
Cohn and Khan (1995)	US	Subjective and Realised Match (RM)	**WSA:** 33% OE, 20% UE; **RM:** 13% OE, 12% UE
Battu, *et al.* (2000)	UK	Subjective-satisfaction Job Analyst Subjective- degree requirement	**WSA-satisfaction:** 40.4% OE **JA:** 40.7% OE **WSA- degree requirement:** 21.75% OE
Chevalier and Walker (2001)	UK	Job Analyst Subjective	**JA:** 13% OE in 1985, 18.9% (Male): 14.7% OE in 1985, 21.6% (Female) **WSA** 33.8% OE in 1985, 33.8% (Male): 30.9% OE in 1985, 30.9% (Female)
Groot and Maassen (2000b)	Holland	Subjective Job Analyst Realised Match	**WSA** 8.7% OE, 3.8% UE (male), 13.6% OE, 2.1% UE (female) **JA** 12.3% OE, 13.3% UE (male), 19.5% OE, 5.7% UE (female) **RM** 11.5% OE, 16.7% UE (male), 12.2% OE, 14.2% UE (female)
Bauer (2002)	Germany	Realised Match using Mean and Modal Values	**Mean Index:** 12.3% OE, 10.4% UE (male), 10.7% OE, 15.6% UE (female) **Mode Index:** 30.8% OE, 20.6% UE (male), 29.9% OE, 37% UE (female)
Chevalier (2003)	UK	Job Analyst Subjective Subjective- Job requirements	**JA:** 17% OE **WSA:** 32.4% OE **WSA-Job requirements:** 16.2% OE
Kler (2005)	Australia	Realised Match Job Analyst	**RM:** 19% OE, 11% UE (male), 17% OE, 13% (female) **JA:** 7% OE, 45% UE (male), 10% OE, 50% UE (female)
Lourdes, *et al.* (2005)	Spain	Subjective approach to measure Education and Qualification Mismatch	**Education Mismatch:** 35% OE, 26% UE **Qualification Mismatch:** 34% OQ, 44% UQ
Dieter and Omey (2006)	Belgium	Subjective and Job Analyst	**WSA:** OE 39.2%, UE 3.4%; **JA:** OE 26.4%, UE 4.9%

Note: OE for over-education, UE for under-education, AE for adequate education, OQ for Over-qualification and UQ for under-qualification

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Appendix Table 2

A Reviewed Summary of Studies Over the Incidence of Education-Job Mismatch

Author	Country	Time Frame	Definition Type	Estimates
Duncan and Hoffman (1981)	US	1976	Subjective	42.0% OE, 11.9% UE, 46.1%AE
Rumberger (1987)	US	1969, 1973 and 1977	Job Analyst	1969: 35% OE , 1973: 27% OE and 1977: 32% OE
Verdugo and Verdugo (1989)	US	1980	Realised Match	10.9% OE, 9.9% UE and 79.2% AE
Sicherman (1991)	US	1976, 1978	Subjective	40% OE, 16% UE, 44% AE
Alba-Ramirez (1993)	Spain	1985	Subjective	17% OE, 23% UE, 60% AE
Groot (1993)	Netherlands	1983	Realised Match	16.1% OE, 16.3% UE, 67.5% AE
Robest (1995)	US	1976, 1978 and 1985	Subjective	36% OE, 20% UE and 44% AE (Pooled estimates for 3 years)
Battu, *et al.* (1999)	UK	1986, 1991 and 1996	Degree required (yes/no)	For 1985: 37.6% OE (males), 46.4% (females) For 1991: OE 41.6% (male) 45.3% (female) For 1996: OE 41.3% (male) 39.3% (females)
Cohn and Ng (2000)	Hong Kong	1986 and 1991	Realised Match	For 1986: 38% OE (male) 32% OE (female); 28% UE (male) 24% OE (female) For 1991: 37% OE (male) 31% OE (female); 28% UE (male) 23% UE (female)
Dolton and Siles (2001)	UK	1998	Subjective	42% OE first job in terms of degree being 22% OE current job necessary to do the work 33% did not require a degree to get job
Jim and Velden (2001)	Holland	1998	Subjective	33% OE(male),10.7% OE(female),10.4% UE(male),15.6% UE(female)
McGuinness (2003)	Northern Ireland	1997-2000	Subjective	29% OE first job, 24% OE current job
Decker, *et al.* (2002)	Holland	1992	Subjective	For 15-19 age 41.7% OE; For 30.44 age 27.0% OE For 49-64 age 18.0% ; Overall 30.6% OE
Voon and Miller (2005)	Australia	1996	Realised Match	15.8% OE(male), 13.6% (female); UE 13.7% (male), 18.53% (female); AE 70.53%for male, 67.86% for female
Budria, *et al.* (2007)	12 European Countries	European Community Household Panel 2001	Subjective	In Europe 21.92% OE; In Australia 15.61% OE, 19.13 for Belgium, 19.33% for Denmark, 20.09% for Finland, 23.68% for France, 14.29% for Germany, 29.81% for Greece, 16.26% for Ireland, 30.35% for Itlay, 25.47% for Portugal, 25.01% for Spain, 19.42% for UK

Note: OE for over-education, UE for under-education, AE for adequate education.

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