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Robust weighted ridge regression based on S – estimator

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Abstract

Ordinary least squares (OLS) estimator performance is seriously threatened by correlated regressors often called multicollinearity. Multicollinearity is a situation when there is strong relationship between any two exogenous variables. In this case, the ridge estimator offers more reliable estimations when such scenario occurs. Outliers can have significant impact on the estimation of regression parameters leading to biased results. However, both OLS and Ridge estimators are sensitive to outlaying observations (outliers). The outlier – prone dataset in the endogenous variable has been efficiently solved utilizing the Robust M estimator in our recent paper. In recent studies, Robust M estimator has some drawbacks despite its efficient performances with outlier – prone dataset in the dependent (endogenous) variable hence the consideration of the Robust S estimator. The Robust S estimator is less sensitive to outliers in both endogenous and exogenous variables and utilizes standard deviation rather than the median in the case of Robust M estimator to handle outliers in the endogenous variable. The Robust ridge based on the S estimator was well suited to model dataset with multicollinearity and outliers problems in the endogenous variable. Also, it was noted in literature that outliers are one of the causes of heteroscedasticity and non – robust weighted least squares were initially employed to figure out for them. In this study, we introduced proposed Robust S weighted ridge estimator by adding a novel weighting method to address the three problems in a linear regression model. The selected Ridge estimators and Robust S estimator in two weighted versions (True weight (Wo) and suggested new weight (W_1)) were combined to respectively develop the Robust S Ridge and Robust S Weighted Ridge estimators. Monte – Carlo simulation experiments were conducted on a linear regression model with three and six exogenous variables exhibiting different degrees of Multicollinearity, with heteroscedasticity structure of powers, size of outlier in endogenous variable and error variances and five levels of sample sizes. The Mean Square Error (MSE) was used as a criterion to evaluate the performances of the new and existing estimators. Simulation findings show categorically that the new approach is preferred over previous approach and hereby recommended.

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1. Introduction

Multiple Linear regression is a statistical technique used to simulate relationship between two or more exogenous variables and an endogenous variable [1]. The model is simply defined as follows:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots\ldots\ldots + \beta_k x_{ik} + u_i, \quad i = 1, \ldots, n, \tag{1}$$

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where y_i is the endogenous variable, $x_{i1}, \ldots, x_{ik}$ are the exogenous variables, $\beta_0, \beta_1, \ldots, \beta_k$ are the unknown coefficients needed to be computed, u_i denotes the disturbance term and it is believed to be normally distributed with mean zero and unity variance σ^2. The Technique of Least Squares (TLS) is widely used to calculate the parameters in Model (1). When conventional assumptions are made for linear regression models, the technique of least squares has several appealing qualities [2, 3]. These include the covariates not sharing a linear relationship; the distribution of the error terms is normal and unscattered variances among others [4].

Most of the aforementioned presumptions are easily violated in real–world situations. For instance, literature has demonstrated multicollinearity, or the habitual existence of linear dependency among regressors [5]. The covariates have a propensity for perfect, strong, or moderate linear dependency [5, 6]. When there is linear dependency among the covariates, the least squares technique is unbiased yet inefficient [7]. Regression coefficients are produced, however their absolute values are too high and their signs could even shift with small data changes [8]. When there is high multicollinearity, estimates of the regression coefficients can still be calculated, but they produce enormous standard errors [7]. Since regression coefficients with significant sampling error have an impact on both inference and forecasting outcomes from the model, the interpretation of the regression coefficients may ceased to be valid [9].

There are several strategies for dealing with multicollinearity, such as the Ridge estimator [10], Liu estimator [11], Partial least square regression [12], Principal component regression [13], Liu–type estimator [14], Modified ridge–type estimator [15], Modified Liu–estimator [16], Kibria–Lukman estimator [17], Jackknife Kibra–Lukman estimator [18], and others. However, these estimators (Ridge, Liu, K – L estimators etc) are not sensitive to outlier problem.

Outliers are observations that stand out from the rest of the observations being considered [19]. All of the aforementioned techniques behave differently when an outlier is present. It results in a discernible modification of model estimations, including forecasted values, estimated variation, and others [20–22]. Additionally, the presence of an outlier observation violates the premise of normality assumptions [20, 21]. Knowing that the estimator's breakdown point is extremely low, for example, one outlier figure had a significant impact on TLS's performance [20–22]. When the LRM is tainted by extreme values or significant observations, robust approach is a viable alternative to TLS. The M estimator is the most frequently used robust methods for dealing with outlier in the explained variable [23]. The weakness of M estimator led to the introduction of S estimator. Others include the MM estimator, the Least Trimmed Squared estimator, Least Absolute Deviation estimator, Least Quantile of Squares estimator [24–28] etc.

Multicollinearity and outliers can coexist in a model, according to recent studies. By combining some of the existing strategies for tackling each problem separately, efforts have been made to reduce the two separate problems [22, 29–34]. For instance, the robust ridge [33] was created by fusing the ridge estimator for multicollinearity with the M–estimator for controlling outliers. The robust Jackknife ridge estimator was proposed to handle both problems [29].

Weighted least squares have up till now been used in the literature as a solution to the heteroscedasticity problem. A model's heteroscedasticity may be caused by an outlier, since outlier is an error problem [35]. By combining the weighted ridge regression with certain reliable robust estimators, we chose to provide a novel method for managing the three problems simultaneously i.e. multicollinearity, heteroscedasticity and outliers.

The efficiency of this novel estimator was compared to various currently used methods in this study Section 2 contains the methodology. Section 3 contains simulation studies, Section 4 contains simulation results and also in appendix while Section 5 contains conclusion.

2. Robust weighted ridge estimator

The matrix form of a linear regression models is defined as:

$$y = X\beta + U, \tag{2}$$

where $y_{(nx1)}$ is vector of dependent variable, $X_{(nxp)}$ is matrix of regressors, $\beta_{(nx1)}$ is vector of the model parameters, and $U_{(nx1)}$ is vector of error terms/disturbance. The model in canonical form is given by:

$$y = W\alpha + U, \tag{3}$$

where $W = XQ$, $\alpha = Q'\beta$ and Q is the orthogonal matrix whose columns constitute the eigen vectors of $X'X$. Then, $W'W = Q'X'XQ = \Lambda = diag\left(\lambda_1, \ldots, \lambda_p\right)$.

2.1. Some alternative ridge estimators to OLSE

The ridge estimator [11] is defined as:

$$\hat{\beta}_{RIDGE} = (W'W + kI)^{-1}W'y, \tag{4}$$

where k is the impacting parameter which is not negative. There are several ways to derive k in the literature. These include:

$$\hat{k}_i(HK) = \frac{\hat{\sigma}^2}{\hat{\alpha}_i^2}, \quad i = 1, 2, 3, \ldots, p, \tag{5}$$

where $\hat{\sigma}^2 = \frac{\sum_{i=1}^{n} e_i^2}{n-p}$ is the mean square error from the MLS, α_i is the ith element of the vector, and is the regression coefficient from the MLS.

Following Ref. [36], k is given by:

$$KGRFA = \hat{k}_i^{Min}(FA) = \frac{\hat{\sigma}^2}{\hat{\alpha}_i^2}\left\{\left[\left(\frac{\hat{\alpha}_i^4\lambda_{Min}^2}{4\hat{\sigma}^2}\right) + \left(\frac{6\hat{\alpha}_i^4\lambda_{Min}}{\hat{\sigma}^2}\right)\right]^{\frac{1}{2}} - \left(\frac{\hat{\alpha}_i^2\lambda_{Min}}{2\hat{\sigma}^2}\right)\right\}, \tag{6}$$

where $\lambda_{Min} = Min(\lambda_i) = 1, 2, 3, \ldots, p$.

Following Ref. [17], k is given by:

$$KGRKL = \hat{k}_i^{Min}(KL) = \min\left(\frac{\hat{\sigma}^2}{2\hat{\alpha}_i^2 + \left(\frac{\hat{\sigma}}{\lambda_i}\right)}\right). \tag{7}$$

In this study, we also obtain the ridge parameter using the cross–validation approach [37, 38].

2.2. Proposed robust S weighted ridge estimator

In this research, the proposed estimator called robust S weighted ridge estimator is defined as:

$$\hat{\alpha}_{KVT}(k, v, g) = (W_k^I\Omega_v^{-I}W_k + k_gI)^{-1}(W_k^I\Omega_v^{-I}y_k), \tag{8}$$

where W_k is canonical matrix associated ridge parameter k for solving multicollinearity. $\Omega_w^{-1} = P_w^{-1}P_w^{-1}$, $\Omega_w = P_w^{|}P_w$ measures the heteroscedastic structure of the error variance with weight w, and k_g is the robust ridge parameter to handle multicollinearity and outlier. The robust ridge parameters are defined based on the S–estimator. In the previous study, M–estimator was adopted to handle outlier but the weakness of M–estimator which is the lack of consideration on data distribution and that M–estimator only uses Median as weighted value. The weakness of M–estimator led to this new study by suggesting S–estimator which uses residual standard deviation to overcome the weakness of the median approach in M–estimation technique. The S–estimator is defined as

$$\min\hat{\sigma}\left(e_i\left(\hat{\beta}\right), ..., e_n\left(\hat{\beta}\right)\right). \tag{9}$$

Therefore, the robust ridge parameter based on S–estimator is defined as follows:

$$KGRHK_S = \frac{\Omega_S}{\hat{\alpha}_{i,S}^2}, \tag{10}$$

where Ω_S is the variance for the S – estimate, $\hat{\alpha}_{i,S}^2$is the S–estimate.

$$KGRFA_S = \hat{k}_i^{Min}(FA) = \frac{\Omega_S}{\hat{\alpha}_i^2}\left\{\left[\left(\frac{\hat{\alpha}_i^4\lambda_{Min}^2}{4\Omega_S}\right) + \left(\frac{6\hat{\alpha}_i^4\lambda_{Min}}{\Omega_S}\right)\right]^{\frac{1}{2}} - \left(\frac{\hat{\alpha}_i^2\lambda_{Min}}{2\Omega_S}\right)\right\}, \tag{11}$$

$$KGRKL_S = \hat{k}_i^{Min}(KL) = \min\left(\frac{\Omega_S}{2\hat{\alpha}_i^2 + \left(\Omega_S/\lambda_i\right)}\right). \tag{12}$$

As earlier mentioned, we adopted the weighted method defined in equation (8) to handle multicollinearity, heteroscedasticity and outlier in this study. Since the weight Ω_S is not always known in practice, there is a need to estimate the weight. The Weighted Least Squares (WLS) procedure is explained in previous research. The following scenarios allow the proposed estimator to revert to Generalized Least Squares (GLS), Robust Ridge, and OLS estimators:

$$\hat{\beta}_{RWR}(0, \Omega, 0) = (X'\Omega^{-1}X)^{-1}X'\Omega^{-1}y = \hat{\beta}_{GLS}\text{, the GLS estimator} \tag{13}$$

$$\hat{\beta}_{RWR}(k_R, 1, 0) = (X'X + k_RI)^{-1}X'y = \hat{\beta}_{RR}\text{, the Robust Ridge estimator,} \tag{14}$$

$$\hat{\beta}_{RWR}(k, \Omega, 0) = (X'\Omega^{-1}X + kI)^{-1}(X'\Omega^{-1}y) = \hat{\beta}_{WRE}\text{, the Weighted Ridge estimator,} \tag{15}$$

$$\hat{\beta}_{RWR}(0, 1, 0) = (X'X)^{-1}X'y = \hat{\beta}\text{, the OLS estimator.} \tag{16}$$

3. Simulation procedure and studies

The study uses a Monte Carlo simulation to compare the performance of the suggested estimator to some other existing estimators from the literature.

Utilize the linear regression model stated as follow:

$$y_t = \beta_0 + \beta_1 X_{m1} + \beta_2 X_{m2} + ... + \beta_p X_{mp} + U_m, \tag{17}$$

where $m = 1, 2,\ldots,$ n; $p = 3, 6$, $U_t \approx N(0, \sigma^2 I_n)$, $X_{ti,}$, m = 1,2,. . . ,n; i = 1,2,. . . ,p are fixed regressors. The regressors are generated using the following procedure [36]:

$$X_{ti} = (1 - \rho^2)^{\frac{1}{2}} Z_{ti} + \rho Z_{tp}, \tag{18}$$

where ρ represents the correlation between any two regressors, and Z_{ti} is a distinct standard normal distribution with a mean of 0 and unit variance and p is the number of exposure variables. The error terms U_t were generated to be normally distributed with mean zero and varianceσ_i^2. The heteroscedasticity problem was introduced into the model with the equation:

$$u_i = z\sigma \sqrt{E(y_i)^{2\delta}}. \tag{19}$$

δ_t^2 symbolizes the heteroscedasticity variance and U_t denotes the error term. The experiment was run using Monte Carlo simulation with a range of settings, including sample sizes (n = 15, 20, 30, 50, 100); level of multicollinearity (ρ = 0, 0.8, 0.9, 0.95, 0.99, 0.999) and delta (δ= 1, 2). In the study, σ^2 values were 1, 25 and 100. $E(y_i)$ = expected value of the regression under consideration.$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + u_i$ for p = 3 and $y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + u_i$for p = 6. Outliers were introduced into the y direction.

1. Employing the Equal Probability Selection Method (EPSM), a random sample of the produced data including a predetermined number of outliers (10%) is taken. Then, in accordance with step 3, it was inflated with outliers.
2. Determine the outlier magnitude, which is expressed as the degree of outlier (k). In the research, k equals 1 and 5.
3. A typical instance of a regularly distributed random variable is y_1, y_2,..., y_n. as appropriate, Y. Then,

$$y_i^* = k[\max(y)] + y_i,$$

where $_{y_i^*=}$ inflated observation replace y_i, yi = substituted sampled observation, and K = the size of the magnitude of an outlier.

For more detail on the generating the outliers see Refs. [22, 39]. The experiment was repeated 1000 times (number of replication). Using the Mean Square Error specifications, the efficiency of the estimators were compared. For any estimator$\hat{\beta}$, MSE is defined as follows:

$$MSE(\hat{\beta}) = \frac{1}{1000} \sum_{i=1}^{p} \sum_{j=1}^{1000} \left(\hat{\beta}_{ij} - \beta_i\right)^2 \tag{20}$$

where $\hat{\beta}_{ij}$ is i^{th} element of the estimator β in the j^{th} replication which gives the estimate of β_i. β_i are the true value of the parameter previously mentioned. Estimator with the minimum MSE was considered best. We compare the following:

1. OLS
2. Robust ridge using $KGRFA_S$ as the ridge parameter. We abbreviate this as SFA
3. Robust ridge using $KGRHK_S$ as the ridge parameter. We abbreviate this as SHK
4. Robust ridge using $KGRKL_S$ as the ridge parameter. We abbreviate this as SKL
5. Robust ridge using CV as the ridge parameter. We abbreviate this as SCV
6. Robust weighted ridge using $KGRFA_S$ as the ridge parameter and adopting the initial weight. We abbreviate this as SWOFA.
7. Robust weighted ridge using $KGRHK_S$ as the ridge parameter and adopting the initial weight. We abbreviate this as SWOHK
8. Robust weighted ridge using $KGRKL_S$ as the ridge parameter and adopting the initial weight. We abbreviate this as SWOKL
9. Robust weighted ridge using CV as the ridge parameter and adopting the initial weight. We abbreviate this as SWOCV
10. Robust weighted ridge using $KGRFA_S$ as the ridge parameter and adopting the new weight in previous study. We abbreviate this as SW1FA.
11. Robust weighted ridge using $KGRHK_S$ as the ridge parameter and adopting the new weight in previous study. We abbreviate this as SW1HK.
12. Robust weighted ridge using $KGRKL_S$ as the ridge parameter and adopting the new weight in previous study. We abbreviate this as SW1KL.
13. Robust weighted ridge using CV as the ridge parameter and adopting the new weight in previous study. We abbreviate this as SW1CV.

Each estimator's MSE was rated for each level of multicollinearity, heteroscedasticity, outliers, and error variance. Multicollinearity, heteroscedasticity, outliers, and error variance levels were taken into account when counting the instances in which each estimator had a minimal MSE (rank 1 and 5). The largest number of counts in an estimator makes it the best.

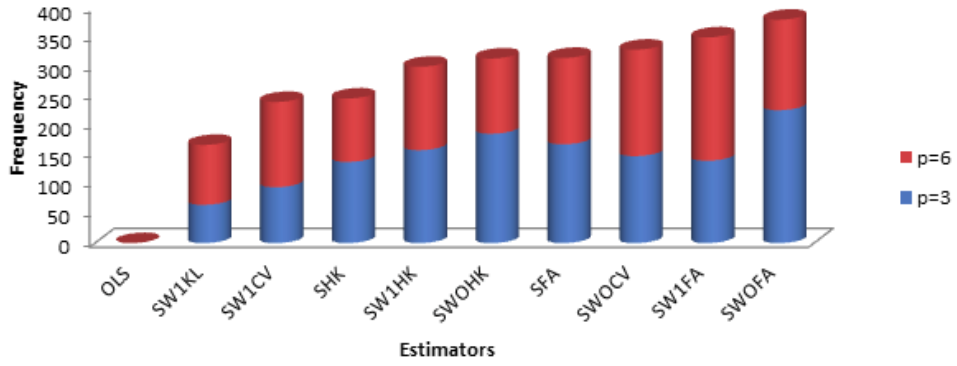

Figure 1: Component Bar Chart showing frequency of counts at which MSE is minimum ranking between 1 and 5 at $p = 3$ and $p = 6$ for both OLS and Robust S Estimation Methods.

Figure 2: Multiple Bar Chart displaying the performance of the estimators at different number of samples.

4. Results and discussion

We summarized the results graphically and in Tables.

Figure 1 shows that the SWOFA is the best (most efficient) estimator with Multicollinearity, Heteroscedasticity, and Outlier problems (Y direction) i.e. proposed Robust S Weighted Least Squares with Real Weight and One parameter ridge estimator of Fayose and Ayinde [36] followed by SWIFA i.e. proposed Robust S Weighted Least Squares with Weight One and One parameter ridge estimator of Fayose and Ayinde [36] while SWOCV i.e. proposed Robust S Weighted Least Squares with Real Weight and 'k' parameter from Cross Validation came third, respectively.

From Figure 2, SWOFA estimator's performance improved as sample size increase from 15 to 100 at $p = 3$ and $p = 6$, respectively. SW1FA performed majorly at small sample sizes while its performance reduced at large sample sizes at $p = 3$ and $p = 6$. Finally, OLS estimator didn't perform at all sample sizes in Figures 1 and 2.

From Figure 3, SWOFA i.e. proposed Robust S Weighted Least Squares with Real Weight and One parameter ridge estimator of Fayose and Ayinde [36] is the most efficient estimator followed by SWOHK i.e. proposed Robust S Weighted Least Squares with Real Weight and One parameter ridge estimator of Hoerl and Kennard [11] while OLS is inefficient at $p = 3$ but when $p = 6$, SW1FA i.e. proposed Robust S Weighted Least Squares with Weight One and One parameter ridge estimator of Fayose and Ayinde [36] is the most efficient estimator followed by SWOCV i.e. proposed Robust S Weighted Least Squares with Real Weight and 'k' parameter from Cross Validation. Finally, OLS estimator is inefficient in Figures 1, 2 and 3, respectively.

The appendix contains the simulation results (Tables A. 1 to A. 60). However for the sake of comparison, the findings are provided in Table 1.

From Table 1, when $p = 3$, we observed that the most efficient estimator is SWOFA as observed in Figure 1. The proposed robust S weighted ridge estimator with the ridge parameter SWOHK is ranked second but when $p = 6$, we also observed that the most efficient estimator is SW1FA but SWOCV ranked second. The OLSE is impacted by the presence of heteroscedasticity, multicollinearity, and outliers as predicted in the model.

Figure 3: A line graph displaying the performance of the estimators at $p = 3$ and $p = 6$.

Table 1: Tally of Estimators that found Minimum MSE if Multicollinearity, Heteroscedasticity, Outlier (y direction), and Error Variance were taken into account.

p	Estimators	Sample Size (n)					TOTAL	RANK
		15	20	30	50	100		
3	OLS	0	0	0	0	0	0	10^{th}
	SW1KL	22	15	20	6	2	65	9^{th}
	SW1CV	36	34	15	8	2	95	8^{th}
	SHK	20	28	21	33	36	138	7^{th}
	SW1HK	21	25	37	30	45	158	4^{th}
	SWOHK	20	24	38	48	56	186	2^{nd}
	SFA	37	**42**	27	37	25	168	3^{rd}
	SWOCV	**42**	32	20	28	26	148	5^{th}
	SW1FA	33	39	32	21	15	140	6^{th}
	SWOFA	27	30	**53**	**56**	**60**	226	1^{st}
6	OLS	0	0	0	0	0	0	10^{th}
	SW1KL	37	32	19	11	3	102	9^{th}
	SW1CV	**57**	41	35	9	3	145	5^{th}
	SHK	4	2	24	37	41	108	8^{th}
	SW1HK	9	38	25	35	35	142	6^{th}
	SWOHK	9	9	24	42	44	128	7^{th}
	SFA	38	7	37	36	29	147	4^{th}
	SWOCV	43	33	34	33	38	181	2^{nd}
	SW1FA	46	**45**	**57**	34	28	210	1^{st}
	SWOFA	7	8	32	**49**	**58**	154	3^{rd}

NOTE: Estimator with highest frequency at each sample size is bolded at $p = 3$ and $p = 6$.

5. Conclusion

Linear regression models (LRMs) are widely used to predict the response variable from a set of regressors. It is well known that multicollinearity reduce the efficiency of the ordinary least square method. In this case, ridge estimator and other estimation methods give better estimates. However, most of these methods (OLS, ridge and others) are susceptible to outliers. When there is an outlier in the outcome variable in LRMs, robust estimators (e.g., S – estimator) provide more efficient predictions. Also, weighted least square estimators solve heteroscedasticity problem in LRMs. In practice, the three problems can simulteaously exist in models. Robust S weighted ridge estimator is popularly employed to account for them. In this study, we adopted the robust weighted ridge and considered the real weight and proposed a new weight for the purpose of handling the three threats. We conducted a simulation study and observed that the proposed methods fit well to the model than the existing ones. Though robust S Ridge estimator competes favorably with the Robust S Weighted Ridge estimator.

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Appendix A.

Table A. 1: MSE result when the magnitude of outlier is 1, $\rho = 0.8$ and $\sigma^2 = 1$.

		σ^2=1	$\delta^2 = 1$	$k = 1$						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	4.50169	6.458829	1.201181	1.890803	1.081163	6.007301	5.819461	3.811372	2.557778	1.7415706
SR1HK	3.314989	2.993766	2.677258	3.481925	3.708931	1.818055	1.62409	1.190666	0.827849	1.5957913
SR1FA	3.628507	3.955671	3.008939	3.971442	3.776615	1.590842	2.338454	1.578103	1.188732	2.2365225
SR1KL	4.295335	4.533444	3.416131	5.02066	4.648185	2.147098	2.432728	1.6521	1.541446	2.737242
SR1CV	5.530373	6.784212	3.941243	5.965915	5.076776	3.052615	5.064937	2.452427	2.424014	3.5934578
SWLSWOR1HK	2.250537	0.827742	0.949691	1.447443	0.469781	2.110115	1.080036	0.806271	1.133704	1.6512363
SWLSWOR1FA	2.601202	0.687959	0.964838	1.356678	0.593823	2.031027	0.974205	0.738774	1.280033	1.5636396
SWLSWOR1KL	3.032024	1.261062	1.12407	2.526035	0.414326	2.199378	1.369205	0.782933	1.876724	3.101439
SWLSWOR1CV	2.973501	1.772216	1.113776	2.115585	0.630176	2.25487	1.642822	1.070847	1.399063	2.4051876
SWLSW2R1HK	1.067715	1.06934	0.971767	1.068376	0.933299	1.03146	0.853047	1.003436	0.996712	1.0018321
SWLSW2R1FA	1.036241	1.077231	0.979898	1.111266	0.95362	1.016272	0.863774	1.010906	1.004178	1.0235355
SWLSW2R1KL	1.130558	1.157685	1.00345	1.362236	1.163451	1.062639	0.926507	1.031836	1.043388	1.1325469
SWLSW2R1CV	1.203577	1.246444	1.016412	1.509814	1.251114	1.08115	0.878108	1.052272	1.049873	1.1668974

NOTE: k = Magnitude of outlier, ρ= multicollinearity level, σ^2= error variance value and δ^2= delta

Table A. 2: MSE result when the magnitude of outlier is 5, $\rho = 0.8$ and $\sigma^2 = 1$.

		σ^2=1	$\delta^2 = 1$	k= 5						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	52.00884	98.36983	21.3197	35.04379	22.60642	64.33209	46.10931	59.37381	49.62696	36.366823
SR1HK	2.544669	2.052589	2.028937	2.314723	2.572908	1.553657	1.603365	0.819236	0.672125	1.1855052
SR1FA	4.442728	5.75627	4.230906	4.659828	4.52206	2.282934	3.39754	2.211486	1.588029	3.5273747
SR1KL	7.951281	10.22866	8.45424	12.72945	13.08096	5.097245	5.990662	4.06269	6.983972	10.090352
SR1CV	7.235819	20.84119	8.673325	15.23117	15.2395	2.753741	1.103655	7.08072	9.640026	17.22504
SWLSWOR1HK	1.859705	0.948444	0.946766	1.086474	0.751389	1.611758	1.052444	0.997042	1.073943	1.2677606
SWLSWOR1FA	2.873202	1.085492	0.866782	1.232416	0.925951	2.950339	1.555953	1.186336	1.319122	1.4520885
SWLSWOR1KL	5.047901	3.343474	1.158542	3.755666	1.537486	3.725964	2.434962	1.973269	2.481385	4.3747365
SWLSWOR1CV	3.438348	3.893347	1.692762	2.677813	1.387342	2.045886	0.988359	1.706715	1.629082	2.9278209
SWLSW2R1HK	1.059574	1.039924	0.990078	1.029012	0.922396	1.025037	0.825404	1.00185	1.006136	1.0240809
SWLSW2R1FA	1.084013	1.121163	1.00602	1.190645	1.019273	1.011955	0.799655	1.020483	1.033222	1.065936
SWLSW2R1KL	1.407511	1.800193	1.275617	3.248363	3.384867	1.056206	0.819739	1.214289	1.678663	2.6017512
SWLSW2R1CV	1.457169	1.925988	1.211026	4.06371	4.323043	1.095821	0.816159	1.239093	1.672322	2.9833541

MSE result when the magnitude of outlier is 5, $\rho = 0.99$ and σ^2=25

Table A. 3: MSE result when the magnitude of outlier is 1, $\rho = 0.8$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	$k = 1$						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	22.24595	58.26637	3.791314	12.39324	6.63006	22.94177	28.51651	22.07614	17.03481	10.043072
SR1HK	3.101573	2.554975	2.541758	2.776711	3.134293	3.119267	2.204757	1.15001	0.763155	1.3801764
SR1FA	3.850231	5.387466	3.244433	4.110786	3.921034	1.928724	3.683394	2.207045	1.503735	2.7361554
SR1KL	6.091004	8.603312	4.447036	8.140546	7.539257	4.250438	5.15581	2.921814	3.371354	4.9016905
SR1CV	7.258617	16.13311	4.958244	8.876564	8.099095	4.616592	11.98725	3.686011	4.992499	7.2375705
SWLSWOR1HK	1.482451	1.106208	0.978009	1.007903	1.006945	0.949635	0.867707	0.978713	1.018095	1.0005258
SWLSWOR1FA	1.445427	1.172453	0.987278	1.025931	1.002641	1.288566	0.918663	0.97599	1.012167	1.0035295
SWLSWOR1KL	1.84102	1.873642	0.916613	1.139488	1.085111	1.030704	1.079307	0.975318	1.172727	1.1058006
SWLSWOR1CV	1.719949	2.166535	0.944861	1.181872	1.075015	2.014234	1.155523	0.99521	1.024857	1.045428
SWLSW2R1HK	1.156495	1.061551	0.980006	0.959096	0.875094	1.160226	0.859537	1.003155	0.996694	0.9995406
SWLSW2R1FA	1.191641	1.114648	0.988737	1.029996	0.921442	1.078871	0.857002	1.017257	1.010117	1.0050653
SWLSW2R1KL	1.439048	1.611386	1.009011	1.583951	1.144119	1.238337	0.929376	1.098375	1.157376	1.2183613
SWLSW2R1CV	1.742033	2.10619	1.018635	1.970799	1.26589	1.265726	0.893075	1.11745	1.145992	1.2356316

Table A. 4: MSE result when the magnitude of outlier is 5, $\rho = 0.8$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	$k = 5$						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	233.5211	664.5821	66.64768	212.9523	135.458	186.4178	167.1862	299.8078	308.0865	203.70151
SR1HK	2.12386	1.494992	1.752943	1.552082	1.627454	2.628431	0.565064	0.81721	0.708425	1.0473196
SR1FA	4.656806	6.589177	4.388636	4.848867	4.780733	2.709996	4.148674	3.094603	2.121799	4.2963759
SR1KL	12.76119	17.94861	12.46281	23.416	26.14568	11.50744	7.49305	8.732668	17.62926	17.758636
SR1CV	12.49331	50.29177	15.43932	39.44814	39.73157	3.369098	1.421541	16.81247	29.86211	49.400615
SWLSWOR1HK	1.500907	1.031218	0.986911	1.009092	1.000102	1.046057	0.504484	0.984356	1.007153	0.9955721
SWLSWOR1FA	1.550691	1.151336	0.986255	1.030835	0.995699	2.707668	0.472125	0.971412	1.015895	0.996153
SWLSWOR1KL	3.616461	2.825035	0.870131	1.304071	1.190057	2.292663	0.456592	1.165388	1.427631	1.3585582
SWLSWOR1CV	2.882964	3.657522	0.936283	1.520966	1.205987	4.826092	0.503544	1.094413	1.051588	1.1136607
SWLSW2R1HK	1.099089	1.039624	0.986689	0.996083	0.948618	1.198029	0.499374	1.000548	1.003263	0.9989011
SWLSW2R1FA	1.25314	1.187937	0.994963	1.149842	0.965745	1.05378	0.486603	1.054378	1.034816	1.016357
SWLSW2R1KL	2.193856	3.109492	1.276914	5.278103	4.379571	1.23992	0.591094	1.663994	2.444737	3.4741153
SWLSW2R1CV	2.065159	4.89184	1.295727	9.923065	7.317136	1.350185	2.604988	1.609221	2.552101	3.9592507

Table A. 5: MSE result when the magnitude of outlier is 1, $\rho = 0.8$ and $\sigma^2 = 25$

		$\sigma^2 = 25$	$\delta^2 = 1$	k = 1						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	87.0185	106.9423	19.77245	30.25489	14.80351	118.3384	127.1504	64.80306	39.35466	26.140892
SR1HK	17.69692	10.28218	4.708681	7.033089	4.193689	17.13534	5.342367	5.632581	2.805858	3.7765772
SR1FA	4.288381	5.7815	3.563813	3.898316	3.777176	3.150251	5.078233	3.024357	1.736388	3.0006066
SR1KL	26.38973	24.15974	10.98673	19.76192	12.47717	22.53812	14.45089	14.1732	11.98931	14.358953
SR1CV	24.40211	22.65387	8.749561	18.27715	9.543194	14.24966	9.713587	9.074336	8.563345	11.219275
SWLSWOR1HK	129.4051	63.6823	7.429497	7.092531	5.04136	693.7204	0.586098	18.64489	3.020206	11.958392
SWLSWOR1FA	29.22076	23.6693	2.621153	6.087617	5.581903	59.59061	0.533085	8.658229	4.28721	9.6641712
SWLSWOR1KL	31.26016	29.96545	7.953947	14.13514	15.13756	35.32478	2.951534	17.77563	9.469399	28.532516
SWLSWOR1CV	13.39298	28.33621	9.368658	6.158961	14.06961	11.96685	0.519952	18.91635	4.930311	14.423278
SWLSW2R1HK	72.09918	25.47578	3.732004	23.78472	10.28193	16.4218	3.075204	5.376926	3.662304	6.2769469
SWLSW2R1FA	8.640429	5.670173	2.514695	8.996006	11.62058	3.571649	0.663332	2.400353	2.749666	5.3583541
SWLSW2R1KL	17.4729	15.23919	6.088381	28.43973	27.19342	9.12932	2.551231	6.160025	8.001286	18.897761
SWLSW2R1CV	28.69083	6.784751	6.220485	7.58201	32.30569	4.774148	0.486926	6.178117	7.714864	18.701135

Table A. 6: MSE result when the magnitude of outlier is 5, $\rho = 0.8$ and $\sigma^2 = 25$

		$\sigma^2 = 25$	$\delta^2 = 1$	k = 5						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	944.6	1033.357	273.8835	425.2101	275.866	766.0531	618.4721	758.0026	621.3506	469.48631
SR1HK	19.78767	8.619342	4.27221	4.928746	2.959173	17.12005	9.607931	4.838678	2.331926	2.7234453
SR1FA	6.239098	7.007825	4.719787	5.074095	4.885157	3.831429	6.348085	4.318029	2.474844	4.7375011
SR1KL	108.3146	79.1675	43.30848	80.60107	74.30696	64.93635	49.76001	57.72837	70.53402	100.76361
SR1CV	18.74693	85.12834	35.93076	77.92898	57.82115	9.386662	1.486186	37.90116	51.57363	86.771471
SWLSWOR1HK	339.8273	59.48868	2.327043	5.242688	1.863157	448.6577	24.35948	14.06608	2.333949	6.316898
SWLSWOR1FA	76.73524	32.23053	2.940182	11.82102	7.275689	120.3114	23.90167	20.17744	8.700549	15.350718
SWLSWOR1KL	177.8481	81.1633	13.90401	46.98562	35.06214	117.5447	53.95833	62.00576	34.00789	88.895666
SWLSWOR1CV	4.05496	81.6676	55.62319	43.07297	33.58374	9.559537	5.063321	26.05358	9.295594	44.470693
SWLSW2R1HK	45.24017	7.766906	2.95493	7.40504	5.892561	13.61239	2.037689	4.69273	2.888395	4.0058006
SWLSW2R1FA	10.15841	6.419819	3.263916	15.79929	24.2141	2.522977	1.813662	3.625127	5.004156	10.426296
SWLSW2R1KL	36.80842	32.85055	19.47884	96.65765	150.7916	7.818136	4.676207	18.0537	37.75531	109.58305
SWLSW2R1CV	30.98819	11.83197	15.94755	86.01896	222.9143	4.710485	0.842584	13.53707	51.08159	141.731

Table A. 7: MSE result when the magnitude of outlier is 1, $\rho = 0.8$ and σ^2=25

		$\sigma^2 = 25$	$\delta^2 = 2$	k = 1						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	746.8849	1339.619	76.05578	233.8772	138.3861	516.7328	729.6907	487.4434	370.7037	208.08249
SR1HK	27.66552	16.01123	4.876252	6.745871	2.496785	52.53379	16.53368	7.426467	1.864855	1.813023
SR1FA	7.803896	10.05643	3.989671	4.833351	4.205506	4.496998	11.09282	6.004492	3.183759	4.1407226
SR1KL	86.21478	125.272	21.05769	60.19062	40.06946	75.4741	59.74691	45.33199	37.03447	40.794114
SR1CV	35.70418	52.61367	16.34358	52.07891	32.46001	32.73968	81.22528	25.59554	35.73305	42.49483
SWLSWOR1HK	64.7294	8.422662	0.96974	1.060886	1.008669	46.64584	1.964292	1.178223	1.040882	1.0142486
SWLSWOR1FA	11.74987	5.829562	0.90685	1.52626	1.035368	53.03748	6.399397	1.558252	1.215557	1.2686339
SWLSWOR1KL	19.54268	18.8768	0.977821	3.373709	1.56889	21.59035	8.250522	3.658251	2.518199	4.2628742
SWLSWOR1CV	49.68652	30.10543	1.220906	2.715314	2.687969	4.977833	14.2823	2.519399	1.116174	1.7228685
SWLSW2R1HK	309.5563	62.19892	1.596352	4.531346	1.453788	106.105	3.968474	6.923102	1.832169	1.6723073
SWLSW2R1FA	118.9354	25.72628	1.932083	13.19728	7.818506	8.292995	1.085893	3.986415	3.089402	3.5533675
SWLSW2R1KL	136.9098	85.73236	4.351804	41.51991	30.17624	28.81485	5.593323	12.95026	14.11474	23.199632
SWLSW2R1CV	39.04353	138.0522	6.891212	75.09527	68.78992	10.69298	0.823131	8.358862	14.64589	27.541175

Table A. 8: MSE result when the magnitude of outlier is 5, $\rho = 0.8$ and σ^2=25.

		$\sigma^2 = 25$	$\delta^2 = 2$	k = 5						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	4079.272	15151.6	1157.383	4076.122	2918.119	3181.833	2711.559	6057.684	6328.32	4000.9242
SR1HK	11.38767	3.434172	3.549405	2.616134	1.331376	45.32884	0.685702	4.156508	1.095278	1.10369
SR1FA	6.393734	7.66688	4.867888	5.165399	5.139502	4.89148	6.244925	6.383863	3.316371	5.4272945
SR1KL	157.0732	216.1463	75.7161	221.1934	160.4406	209.3285	50.16823	157.996	148.03	167.43319
SR1CV	31.86896	597.1265	82.88772	309.9083	293.4214	22.60137	1.380817	126.9532	208.6905	367.29428
SWLSWOR1HK	67.62375	4.885298	0.981156	1.07871	0.993314	34.11595	0.624147	1.415756	1.018067	0.9877328
SWLSWOR1FA	23.9478	8.990407	0.859597	2.075064	1.008123	132.9118	1.750308	2.7587	1.578944	1.4635254
SWLSWOR1KL	64.3417	36.62274	1.469462	8.38088	2.8063	85.04866	8.253842	15.77743	6.159587	15.533297
SWLSWOR1CV	26.26713	107.4967	3.123851	23.09762	19.02175	7.848491	0.528485	10.32234	2.539361	4.259754
SWLSW2R1HK	175.9315	5.788195	1.403168	1.765747	0.970632	145.5347	0.49924	4.066498	1.197388	1.072337
SWLSW2R1FA	40.77409	11.65833	2.558362	17.72155	11.59036	8.170877	0.445861	6.241108	5.034708	5.1401274
SWLSW2R1KL	93.8674	106.1175	14.75117	102.0232	95.75434	23.58381	9.712536	47.28358	52.34157	93.608453
SWLSW2R1CV	4.375896	111.0363	20.49519	347.2447	523.0954	11.36777	20.41041	22.19775	92.16863	197.15714

Table A. 9: MSE result when the magnitude of outlier is 1, $\rho = 0.8$ and σ^2=100.

		$\sigma^2 = 100$	$\delta^2 = 1$	k = 1						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	409.7383	369.1567	73.73116	114.5864	55.22656	460.3995	503.7327	253.2391	151.2933	98.882335
SR1HK	68.05379	43.08903	11.4358	21.2202	7.950503	61.0217	15.73186	21.22667	9.559665	10.469901
SR1FA	5.54993	7.452244	3.806296	3.885259	3.998016	4.430728	8.011244	4.578031	2.381545	3.5727267
SR1KL	107.1988	84.76512	30.59054	63.68904	33.76725	83.21479	42.49236	56.13961	45.97473	48.948075
SR1CV	78.7145	54.75993	17.05043	47.62538	18.99035	34.8428	18.40896	23.77393	20.36858	24.810807
SWLSWOR1HK	2166.193	1313.879	60.38539	56.8054	29.08268	9365.468	4.029226	267.3109	28.25006	103.80923
SWLSWOR1FA	154.5302	126.3291	10.02539	27.52814	19.76934	352.6621	0.901812	47.13519	18.04261	38.392578
SWLSWOR1KL	67.05088	118.0787	28.68524	60.59063	61.36196	99.11538	9.456673	91.19693	46.41774	141.58942
SWLSWOR1CV	56.71211	102.07	53.3907	30.98378	46.92271	51.77785	0.563602	133.0731	16.83076	49.992079
SWLSW2R1HK	1694.444	324.3053	42.90756	199.1981	119.7424	336.0351	80.11304	51.71736	38.59485	73.730104
SWLSW2R1FA	85.98151	29.91198	9.123853	43.59131	71.40649	18.0949	7.176274	11.15424	12.65486	28.944628
SWLSW2R1KL	120.4534	83.72821	36.26168	163.9827	189.0177	48.17969	29.72814	38.21954	53.34464	141.01279
SWLSW2R1CV	166.4339	46.60393	27.3465	8.818574	188.8115	23.28566	0.48924	31.67884	49.44076	117.70524

Table A. 10: MSE result when the magnitude of outlier is 5, $\rho = 0.8$ and σ^2=100.

		$\sigma^2 = 100$	$\delta^2 = 1$	k = 5						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	3430.129	4637.822	1002.401	1739.427	1045.632	2833.318	2524.786	2901.678	2332.625	1732.9088
SR1HK	69.19832	31.69079	11.29945	17.74673	6.541152	65.66981	32.59251	19.65135	7.844914	7.6999794
SR1FA	6.974735	7.510011	5.021787	6.238184	5.014488	4.934423	8.263883	5.847565	3.002637	5.2352188
SR1KL	383.1831	311.4926	153.5968	393.1188	250.6213	244.6649	179.2123	235.486	269.4849	370.82526
SR1CV	53.3564	302.9163	77.19865	661.813	138.0889	20.90723	1.726621	92.51856	122.8039	209.32438
SWLSWOR1HK	4972.183	641.6288	18.55152	51.19175	15.60702	7301.725	407.4873	200.344	19.36414	58.524083
SWLSWOR1FA	363.2856	146.0144	17.26382	60.70236	39.22412	658.5633	135.3413	100.871	42.00876	69.254919
SWLSWOR1KL	326.9465	256.7193	73.458	213.7287	213.97	478.7546	269.5196	333.3171	195.1802	491.30658
SWLSWOR1CV	4.708791	233.7681	231.1791	414.9622	132.8331	26.55822	10.31372	118.8603	29.79455	191.4178
SWLSW2R1HK	695.7721	146.3439	22.7765	489.683	71.4404	201.7812	21.24887	59.87453	29.23394	44.818182
SWLSW2R1FA	53.99196	21.01139	12.79556	106.2652	126.8772	12.41398	4.615138	16.79862	23.7553	54.385279
SWLSW2R1KL	88.94464	190.42	99.30983	970.1109	883.3566	39.99363	19.0751	114.8619	235.8829	719.22349
SWLSW2R1CV	136.4912	33.1077	74.90899	149.3027	1170.912	16.52962	0.839722	59.07629	256.771	722.59307

Table A. 11: MSE result when the magnitude of outlier is 1, $\rho = 0.8$ and σ^2=100.

		$\sigma^2 = 100$	$\delta^2 = 2$	k = 1						
$\rho = 0.8$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	1928.163	4981.912	284.3038	881.7713	547.3737	1964.663	2932.92	1926.075	1461.751	814.36743
SR1HK	74.66687	44.51886	12.06913	21.39321	4.448118	252.6358	46.9116	29.26698	5.23423	3.5316095
SR1FA	6.62549	11.35787	4.197	4.990325	4.383328	9.116712	15.03843	9.368266	4.384082	4.9117618
SR1KL	212.3936	365.1553	62.87781	205.6148	129.3252	340.171	223.1512	182.809	142.9259	147.21
SR1CV	90.60103	225.1944	32.18654	171.9836	83.46039	95.85862	194.2289	65.66808	85.10944	107.60318
SWLSWOR1HK	725.3437	70.43338	1.048694	1.279264	1.016067	1802.85	10.05287	4.896185	1.238961	1.3204332
SWLSWOR1FA	53.93073	25.07107	0.895394	3.183305	1.282631	562.8955	25.62699	5.231646	2.037785	2.9095712
SWLSWOR1KL	95.56906	67.78509	1.813437	11.92447	3.396372	163.0831	26.38098	21.17413	7.652656	23.794059
SWLSWOR1CV	19.63151	63.40236	3.347472	4.674823	7.83515	2.112847	1.076072	12.10074	1.785828	4.1604913
SWLSW2R1HK	3265.27	284.4994	16.30486	41.90381	5.976796	2193.727	12.26522	76.90522	13.04421	10.048026
SWLSW2R1FA	203.6008	91.51989	6.944796	68.05325	44.69403	49.11119	1.534105	20.63296	13.68209	17.910112
SWLSW2R1KL	196.6872	205.2317	25.90176	187.9669	144.7359	169.3649	22.92784	82.82484	85.4276	152.86503
SWLSW2R1CV	113.1357	260.8425	50.24236	360.9449	365.1604	74.45767	0.883258	40.54052	72.5009	161.95573

Table A. 12: MSE result when the magnitude of outlier is 5, ρ = 0.8 and σ^2=100.

	σ^2 = 100		δ^2 = 2	k = 5						
ρ = 0.8			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	15797.64	43056.21	4090.158	12842.92	10950.06	12189.14	10239.38	23733.11	24793.94	15545.079
SR1HK	33.55882	24.68349	10.67473	6.937745	1.81287	181.9799	1.128843	16.70479	2.016502	1.3636616
SR1FA	5.755001	10.21132	5.015125	5.071404	5.137704	6.11811	6.862931	8.064252	3.739039	5.7362246
SR1KL	485.1507	781.7437	268.6864	853.5411	557.0868	814.738	167.4021	640.3466	543.9568	617.13984
SR1CV	57.71504	2207.458	193.8069	1485.857	653.8703	43.50842	1.413769	287.1727	440.7581	851.53836
SWLSWOR1HK	1377.389	236.0032	1.018773	1.258207	0.983121	492.4784	1.447207	8.897155	1.088499	1.0475817
SWLSWOR1FA	89.55137	49.95281	0.897212	5.451184	1.558102	751.4276	7.748087	11.8842	4.010602	4.5659399
SWLSWOR1KL	508.2007	381.7188	3.687231	39.68535	8.087475	489.1723	33.05391	93.16166	22.8632	87.860144
SWLSWOR1CV	7.664474	1610.71	32.85384	5.390736	126.887	13.97583	0.556208	44.16233	3.620449	20.339378
SWLSW2R1HK	1056.339	32.48564	5.32136	4.705187	1.394065	2530.315	0.500567	51.96089	3.620566	1.8027498
SWLSW2R1FA	126.6523	48.37258	9.0124	94.9697	61.5181	52.56017	0.504089	28.19328	22.22772	25.925475
SWLSW2R1KL	266.0899	879.8027	77.46521	519.3074	354.4973	108.7971	42.69132	275.2733	268.3543	464.22119
SWLSW2R1CV	44.40597	1907.399	74.14841	758.739	1757.539	44.2003	27.99372	78.64363	357.5244	896.08431

Table A. 13: MSE result when the magnitude of outlier is 1, ρ = 0.9 and σ^2 = 1.

	σ^2=1		δ^2 = 1	k = 1						
ρ = 0.9			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	22.76808	16.21462	1.909198	3.427396	1.665241	11.20494	7.052194	8.831754	4.69497	3.006493
SR1HK	6.600193	3.222219	2.64001	3.478751	3.675316	2.612415	0	1.376839	1.171774	1.697311
SR1FA	4.85561	4.412823	3.265604	4.317532	4.133223	2.441831	0	1.735545	1.788919	2.364694
SR1KL	7.82016	4.977718	3.456086	5.243731	4.842057	2.901689	0	1.962543	2.137178	2.953609
SR1CV	16.63113	9.232894	4.290199	6.828675	5.550324	4.025414	0	3.565451	4.157864	4.402914
SWLSWOR1HK	1.751609	2.393346	0.519885	1.508909	0.944148	1.785438	0	1.661673	1.00031	1.607013
SWLSWOR1FA	0.814352	2.610654	0.490562	1.77337	1.02016	2.101551	0	2.277993	1.059917	1.315323
SWLSWOR1KL	1.555984	3.745108	0.425096	2.455876	1.579425	1.943569	0	2.467152	1.248912	3.033577
SWLSWOR1CV	1.889901	3.662984	0.731988	2.393682	1.810546	3.19828	0	2.725192	1.213509	1.971321
SWLSW2R1HK	1.270857	1.169069	0.963281	1.237643	0.942389	1.007203	0	1.014149	1.008429	1.009182
SWLSW2R1FA	1.247503	1.167882	0.968249	1.318206	0.982984	1.012823	0	1.022607	1.029159	1.035243
SWLSW2R1KL	1.767763	1.268264	1.014004	1.71471	1.228875	1.042236	0	1.072756	1.113368	1.163421
SWLSW2R1CV	2.134267	1.567296	1.071417	1.94004	1.36644	1.172881	0	1.123517	1.164011	1.222396

Table A. 14: MSE result when the magnitude of outlier is 5, ρ = 0.9 and σ^2 = 1.

	σ^2=1		δ^2 = 1	k= 5						
ρ = 0.9			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	126.5072	271.4696	34.65088	62.63977	30.79532	123.2034	101.1998	138.9451	87.081	60.85179
SR1HK	2.745186	2.421559	2.077594	2.445085	2.368809	2.347796	0	1.061262	0.849651	1.212618
SR1FA	5.509065	6.488417	4.958319	6.190092	6.399279	3.326297	0	2.876482	2.399716	4.857579
SR1KL	8.811236	11.98677	7.796867	14.1504	13.91303	6.343378	0	5.505361	7.311386	10.87857
SR1CV	11.15462	46.86524	11.92931	21.79971	17.60531	4.334026	0	14.45482	16.39178	24.7288
SWLSWOR1HK	1.348766	1.535235	0.775281	1.112638	0.924742	1.159475	0	1.235229	1.012911	1.115373
SWLSWOR1FA	1.450637	2.61729	0.699268	1.41255	0.96108	2.794458	0	2.279357	1.091508	1.131859
SWLSWOR1KL	3.732671	5.855286	1.332321	4.284498	2.330501	2.909554	0	3.299098	1.47141	3.685402
SWLSWOR1CV	2.080868	6.455767	1.856018	4.28503	2.441005	2.681098	0	2.633244	1.277161	2.216335
SWLSW2R1HK	1.237123	1.195251	0.98287	1.092729	0.893457	1.023338	0	1.007418	1.009411	1.016857
SWLSW2R1FA	1.137956	1.245596	1.001936	1.468654	1.077511	1.0202	0	1.052533	1.068194	1.109278
SWLSW2R1KL	1.607961	2.324983	1.45664	4.086184	3.866699	1.067764	0	1.37831	1.874584	2.997354
SWLSW2R1CV	1.704117	1.648387	1.69708	5.634366	5.76243	1.156797	0	1.851041	1.976678	3.640637

Table A. 15: MSE result when the magnitude of outlier is 1, $\rho = 0.9$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	$k = 1$						
$\rho = 0.9$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	60.15271	164.3035	5.995922	28.58405	11.08328	41.28731	54.56183	67.82922	32.08975	19.25399
SR1HK	3.424231	2.953136	2.479217	2.798421	2.955303	4.317628	0	1.564743	0.954229	1.380678
SR1FA	4.935176	6.887222	3.655458	5.14977	4.977746	2.846358	0	2.823293	2.121575	3.342905
SR1KL	7.170568	10.99237	4.352516	9.618285	8.364518	5.11053	0	4.494522	3.891073	5.814013
SR1CV	10.75881	18.8396	5.489049	12.4107	10.03292	4.69784	0	6.740133	8.403519	10.50187
SWLSWOR1HK	0.96232	1.151584	1.044502	1.138612	1.024101	1.279484	0	0.973575	1.000322	0.987309
SWLSWOR1FA	0.842333	1.366708	1.024321	1.06518	1.020842	1.013665	0	0.978932	1.001721	0.996755
SWLSWOR1KL	1.138872	1.913774	1.115049	1.874425	1.291069	1.057351	0	0.999684	1.003667	0.914657
SWLSWOR1CV	0.978475	2.407159	1.042967	1.361647	1.193904	1.252523	0	2.306297	1.002162	0.953223
SWLSW2R1HK	1.310381	1.294235	0.953387	0.976421	0.870191	1.375147	0	1.041498	1.003147	0.996896
SWLSW2R1FA	1.433378	1.357885	0.957844	1.142345	0.912546	1.103339	0	1.062431	1.035223	1.019547
SWLSW2R1KL	1.614259	1.953387	1.01737	2.047446	1.232058	1.578206	0	1.233557	1.273352	1.331519
SWLSW2R1CV	1.817937	2.511519	1.05809	3.224304	1.456821	1.447689	0	1.272567	1.332827	1.39106

Table A. 16: MSE result when the magnitude of outlier is 5, $\rho = 0.9$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	k = 5						
$\rho = 0.9$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	527.637	1521.928	105.7107	483.5593	222.0108	342.6009	373.6179	909.6077	560.8414	374.6429
SR1HK	2.134514	1.615495	1.692504	1.606331	1.498209	4.168489	0	1.020921	0.749741	1.049577
SR1FA	6.541465	7.743069	5.597277	7.240142	7.972341	3.898162	0	4.598773	3.500392	6.972476
SR1KL	14.22528	21.54033	11.08666	30.1594	29.57305	14.4411	0	13.80641	19.26455	18.26063
SR1CV	13.07091	106.1975	19.77014	75.99461	61.4164	5.269135	0	42.31172	55.14109	83.53823
SWLSWOR1HK	1.141262	1.047886	1.029397	1.075922	1.011221	1.033489	0	0.988197	1.000331	0.993274
SWLSWOR1FA	1.560799	1.472832	1.019932	1.077	1.025324	1.483509	0	1.124911	1.005248	0.996246
SWLSWOR1KL	4.124645	2.960456	1.290954	4.545632	1.759863	1.611224	0	1.411287	1.021953	0.923004
SWLSWOR1CV	1.461089	7.055677	1.150346	4.030173	1.55826	5.564704	0	4.039759	1.015005	0.932481
SWLSW2R1HK	1.161439	1.092826	0.976017	0.996792	0.963178	1.650585	0	1.035823	1.0018	1.000981
SWLSW2R1FA	1.921259	1.451309	0.981789	1.442211	1.009543	1.071728	0	1.157792	1.114646	1.041631
SWLSW2R1KL	3.203627	3.951767	1.480894	7.040479	5.395069	1.711173	0	2.318158	3.128892	4.391438
SWLSW2R1CV	1.289718	6.819929	1.69964	23.4075	10.62038	1.395424	0	2.326254	3.995519	6.2914

Table A. 17: MSE result when the magnitude of outlier is 1, $\rho = 0.9$ and $\sigma^2 = 25$.

		$\sigma^2 = 25$	$\delta^2 = 1$	k = 1						
$\rho = 0.9$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	189.6321	203.6889	30.39673	59.78889	49.45181	220.2571	143.4782	145.9341	75.71812	46.45243
SR1HK	34.05336	13.50702	5.619421	9.469015	11.84175	20.59735	0	11.6291	4.376048	4.5527
SR1FA	5.696584	8.962259	4.243019	6.093491	10.65523	4.294462	0	3.672108	2.472317	3.894576
SR1KL	35.67062	24.87894	11.32783	24.16246	31.22107	24.15318	0	22.97978	16.15152	18.85515
SR1CV	35.82937	40.95644	10.18566	26.65644	33.41801	18.8798	0	16.46571	14.85473	16.62009
SWLSWOR1HK	250.8488	263.6681	22.42785	38.84098	15.55334	220.3704	0	47.13992	2.924566	9.627426
SWLSWOR1FA	32.31797	69.6719	4.127839	16.87356	12.86888	50.45178	0	22.39358	2.823664	5.088871
SWLSWOR1KL	28.09174	98.62182	16.91667	44.30807	38.56337	19.74813	0	28.74484	7.381693	22.43238
SWLSWOR1CV	14.96199	14.28487	15.65959	18.76724	24.57415	12.68965	0	18.70371	3.914921	9.568044
SWLSW2R1HK	56.22945	13.21596	8.979338	28.14306	48.92162	35.30199	0	8.748207	5.7252	8.215408
SWLSW2R1FA	11.44279	8.676975	3.836473	17.58415	25.21631	3.584117	0	3.38904	3.743074	6.664281
SWLSW2R1KL	19.49481	16.75331	8.868249	39.3596	78.98005	11.18968	0	9.431866	11.61578	23.30045
SWLSW2R1CV	21.84824	16.45911	10.17233	9.507797	74.21939	5.54312	0	7.68063	10.41786	25.0277

Table A. 18: MSE result when the magnitude of outlier is 5, $\rho = 0.9$ and $\sigma^2 = 25$.

	$\sigma^2 = 25$		$\delta^2 = 1$	k = 5						
$\rho = 0.9$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	1055.301	3729.398	424.3013	877.12	415.0778	1522.008	1140.489	1675.407	1125.057	795.0179
SR1HK	22.38889	13.01775	5.761052	13.82289	3.457389	25.76236	0	11.49762	4.504101	2.7638
SR1FA	7.119323	9.633084	6.416151	8.663594	8.965002	5.617178	0	6.291164	4.297221	8.130857
SR1KL	74.37686	124.4702	45.79935	134.2676	107.9846	78.05658	0	90.03897	87.01681	113.0351
SR1CV	37.45921	324.4886	41.3958	226.2519	56.83516	9.834296	0	77.21315	96.09993	145.052
SWLSWOR1HK	227.1944	212.7108	12.29985	11.02649	4.836677	158.5063	0	33.92423	2.165487	5.059092
SWLSWOR1FA	57.0205	64.89292	6.766086	17.31819	13.3921	105.0385	0	44.15497	5.017472	6.948653
SWLSWOR1KL	75.77072	175.2463	39.43126	108.6712	66.75626	87.83386	0	85.87198	25.6239	64.46821
SWLSWOR1CV	1.488544	91.27381	52.385	76.06793	31.88124	41.03244	0	27.47115	18.76579	32.89162
SWLSW2R1HK	23.58226	17.87547	6.414737	23.88628	4.286358	18.47518	0	8.550606	4.170546	6.117731
SWLSW2R1FA	11.40606	8.631714	5.955889	28.62704	38.13603	3.580232	0	5.432627	7.650502	15.35506
SWLSW2R1KL	36.46722	67.93167	29.01872	179.6793	167.2061	8.633316	0	29.29191	52.43416	136.9824
SWLSW2R1CV	20.14303	89.48301	29.02853	482.857	294.3529	5.032015	0	36.24597	45.83913	166.9612

Table A. 19: MSE result when the magnitude of outlier is 1, $\rho = 0.9$ and σ^2=25.

	$\sigma^2 = 25$		$\delta^2 = 2$	k = 1						
$\rho = 0.9$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	2729.977	4903.716	120.7831	606.204	229.0869	934.1785	1331.899	1504.727	714.4881	409.8633
SR1HK	10.94764	18.34546	6.264346	10.1845	2.561075	64.96975	0	18.84716	3.857486	2.162705
SR1FA	11.65773	17.19201	5.392464	7.553514	7.180416	6.530008	0	9.750567	4.891148	6.636137
SR1KL	89.22805	184.591	23.86901	90.28548	47.44104	80.09299	0	89.19366	54.24515	53.06016
SR1CV	182.9283	140.7146	19.70562	73.16186	51.24103	26.40986	0	51.64666	63.43286	75.61729
SWLSWOR1HK	190.5003	11.11433	0.949434	1.840531	1.07718	224.1229	0	3.25813	1.000885	1.031044
SWLSWOR1FA	17.37066	14.06791	0.896979	2.236332	1.430333	24.67193	0	5.54943	1.017505	1.045932
SWLSWOR1KL	26.75292	24.71817	1.644949	12.6491	3.902094	10.97507	0	8.48658	1.149211	1.922585
SWLSWOR1CV	25.22554	30.11735	1.342931	25.72677	7.110766	31.98026	0	12.18992	1.100619	1.59722
SWLSW2R1HK	91.93206	80.43442	2.849536	12.11072	1.714538	112.8281	0	22.28375	3.316963	2.182061
SWLSW2R1FA	24.66261	29.12863	3.564178	22.03642	11.08125	8.780556	0	7.517081	5.713952	5.590545
SWLSW2R1KL	29.01038	53.17583	7.296634	65.35361	35.87868	33.55234	0	28.89981	22.11124	34.74958
SWLSW2R1CV	15.44575	24.6912	8.803649	158.0511	101.5956	13.38361	0	12.15484	23.63009	51.80483

Table A. 20: MSE result when the magnitude of outlier is 5, $\rho = 0.9$ and σ^2=25.

	$\sigma^2 = 25$		$\delta^2 = 2$	k = 5						
$\rho = 0.9$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	14244.9	37023.13	1894.636	9297.181	4412.545	6058.079	6552.54	18371.55	11830.7	7553.105
SR1HK	5.261481	6.46734	4.26911	4.750834	1.358361	68.30244	0	11.07718	1.847294	1.206973
SR1FA	17.07889	12.69743	7.032635	8.586069	9.862603	7.332938	0	11.23643	6.4147	10.6136
SR1KL	189.8896	480.7864	89.95433	382.7837	195.7555	256.768	0	304.6689	236.3512	185.1919
SR1CV	212.56	1289.06	107.9158	768.3917	430.8836	13.93747	0	280.1593	396.5251	690.7206
SWLSWOR1HK	258.6649	2.202894	1.027806	1.413401	1.056222	195.4035	0	2.992613	1.000433	1.018382
SWLSWOR1FA	67.60587	17.73359	0.937755	2.73943	1.860587	54.78283	0	15.41257	1.064936	1.069345
SWLSWOR1KL	149.786	49.49891	4.580609	31.9987	9.593941	38.8328	0	36.41845	2.176043	5.750021
SWLSWOR1CV	286.2247	42.62516	5.052491	96.00223	52.67815	74.5822	0	27.65442	1.926121	3.148855
SWLSW2R1HK	31.57588	11.44742	1.470636	3.02228	0.985936	350.513	0	15.73563	1.658678	1.188499
SWLSW2R1FA	47.65766	27.10245	5.279625	34.96734	18.98658	9.812461	0	12.65171	10.80651	9.238361
SWLSW2R1KL	77.57521	163.236	21.40917	188.2205	104.6791	42.04224	0	103.4877	79.02371	140.3545
SWLSW2R1CV	1.248725	422.1907	28.34448	885.1639	688.8557	13.15957	0	55.1124	165.1589	365.9968

Table A. 21: MSE result when the magnitude of outlier is 1, ρ = 0.9 and σ^2=100

	σ^2= 100		δ^2 = 1	k = 1						
ρ = 0.9			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	881.9768	541.8924	107.5139	223.7241	199.4628	868.5866	564.1753	567.1471	292.4386	176.9839
SR1HK	174.4792	54.80677	16.01286	32.33735	26.47312	76.94431	0	44.35329	15.58231	13.59277
SR1FA	7.91616	14.11088	5.024873	5.721083	13.30385	6.353541	0	6.014425	3.518724	5.219808
SR1KL	162.0503	78.12745	37.30422	75.80783	84.02518	90.60959	0	90.7807	62.43793	67.66135
SR1CV	95.009	56.24565	20.22443	29.7323	85.90103	41.97303	0	45.18071	37.52605	39.82692
SWLSWOR1HK	5610.908	4832.369	467.8208	476.083	78.79046	3350.22	0	665.3942	22.15792	78.48758
SWLSWOR1FA	195.0132	317.3287	30.91193	66.12176	47.98883	309.0298	0	115.7507	8.269475	18.37184
SWLSWOR1KL	77.33398	194.4394	87.27562	162.7122	143.2918	54.84987	0	119.1645	31.08573	106.2242
SWLSWOR1CV	10.39197	3.683858	59.62883	23.20775	74.2858	31.38267	0	55.52006	17.16906	29.54462
SWLSW2R1HK	1181.142	424.6562	123.1597	1261.198	527.7587	399.5764	0	162.6092	68.338	107.3
SWLSW2R1FA	128.861	95.43228	22.48832	88.727	151.6822	18.36344	0	17.83666	18.44574	36.56396
SWLSW2R1KL	122.6944	215.5119	57.45406	217.2017	547.6605	53.94251	0	58.41169	73.22935	169.7641
SWLSW2R1CV	160.8188	49.09306	50.11613	12.5379	772.3035	20.59211	0	36.83013	56.02841	143.507

Table A. 22: MSE result when the magnitude of outlier is 5, ρ = 0.9 and σ^2=100.

	σ^2 = 100		δ^2 = 1	k = 5						
ρ = 0.9			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	7145.058	10584.24	1561.812	3416.594	2682.773	5679.139	4034.094	6329.663	4238.588	2955.893
SR1HK	194.6182	63.1714	15.12998	42.46297	9.025942	96.44545	0	48.01035	16.84281	7.553261
SR1FA	12.5671	10.93803	7.317072	9.528932	14.75089	7.568573	0	9.26899	5.63888	9.776381
SR1KL	567.3813	402.2974	170.3179	459.0608	450.4914	293.1808	0	364.8329	341.2184	420.6755
SR1CV	129.2662	445.3448	146.6748	623.1101	732.7627	16.42659	0	184.5312	232.9968	361.5027
SWLSWOR1HK	5100.492	2312.634	105.7123	171.9338	40.83388	2517.087	0	504.5329	14.47653	51.10303
SWLSWOR1FA	515.3989	296.8296	39.79572	79.32387	78.5688	601.2074	0	239.2003	18.68628	31.27943
SWLSWOR1KL	272.5777	532.5274	171.9386	526.5291	448.4866	368.7583	0	464.4145	128.3502	372.1425
SWLSWOR1CV	2.002183	190.6288	255.9694	139.4793	206.4736	93.91173	0	83.02723	124.389	141.3343
SWLSW2R1HK	3566.916	438.2498	33.68342	397.9409	100.5863	244.872	0	121.8386	49.42542	71.78692
SWLSW2R1FA	134.8153	44.59237	26.28499	142.2385	267.5613	22.20154	0	26.53663	37.96285	80.66667
SWLSW2R1KL	357.3943	384.1638	166.751	997.1188	1510.765	51.1535	0	189.5382	327.2538	901.5031
SWLSW2R1CV	300.1788	8.935628	70.91006	1503.293	5016.002	16.20732	0	60.03894	190.0457	778.3097

Table A. 23: MSE result when the magnitude of outlier is 1, ρ = 0.9 and σ^2=100

	σ^2 = 100		δ^2 = 2	k = 1						
ρ = 0.9			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	10779.03	9274.591	468.1704	2427.271	905.5901	3702.41	5318.201	5941.763	2825.767	1611.052
SR1HK	39.45203	149.8054	17.06805	32.9364	4.598498	262.5223	0	76.30152	13.88644	4.92917
SR1FA	14.42023	24.4969	6.029913	8.842118	8.167922	10.59791	0	17.08344	7.40472	8.806244
SR1KL	337.3813	520.5659	74.27252	324.823	160.2044	319.3189	0	360.055	217.0201	196.4367
SR1CV	355.852	244.7637	36.8303	245.8424	138.5835	57.342	0	125.8952	154.0345	190.4776
SWLSWOR1HK	2670.16	49.70794	2.584912	7.594567	1.286455	3522.334	0	38.91858	1.006041	1.159614
SWLSWOR1FA	92.50939	41.00957	1.231851	5.541306	3.024343	144.5017	0	30.9361	1.126708	1.224455
SWLSWOR1KL	59.16585	88.58482	7.110937	49.06592	12.72409	36.25771	0	51.33754	2.165953	6.080298
SWLSWOR1CV	61.18003	2.65176	5.048456	162.1206	45.3562	78.66326	0	27.68638	1.929684	3.165688
SWLSW2R1HK	634.1748	2057.247	27.69835	156.2432	9.705248	3638.868	0	309.56	40.46999	17.35802
SWLSW2R1FA	116.6983	504.106	18.8194	115.5864	64.40602	46.58458	0	41.5783	28.9983	30.50774
SWLSW2R1KL	114.2989	217.3632	36.86617	365.0675	175.1831	162.8794	0	175.2547	135.8943	239.2708
SWLSW2R1CV	92.11613	44.66249	50.15945	702.8678	559.1243	45.22823	0	57.93213	115.9383	309.1911

Table A. 24: MSE result when the magnitude of outlier is 5, $\rho = 0.9$ and σ^2=100.

	σ^2 = 100		δ^2 = 2	k = 5						
$\rho = 0.9$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	126857.8	90192.74	7338.8	35158.52	17392.51	23410.74	24983.1	71771.01	46530.32	29489.14
SR1HK	40.18885	47.91126	11.7717	13.77017	1.758217	269.1813	0	46.88318	5.650724	1.709764
SR1FA	10.93605	14.53014	7.371821	9.257778	10.27767	9.564964	0	15.42514	7.648454	11.81216
SR1KL	977.7839	1113.308	320.058	1528.244	688.039	1000.944	0	1239.161	914.4758	695.3696
SR1CV	1018.908	1842.424	236.9853	1590.433	1091.048	23.54379	0	575.4726	833.1481	1609.615
SWLSWOR1HK	3000.58	22.12205	3.432529	4.192937	1.168694	3302.904	0	33.52322	1.0046	1.115942
SWLSWOR1FA	107.5449	71.80846	1.661392	7.268096	5.325068	308.4708	0	81.20408	1.459475	1.401482
SWLSWOR1KL	1048.485	171.6922	23.23397	117.6234	39.60783	166.2519	0	217.7956	8.56255	28.84373
SWLSWOR1CV	2.258981	12.34219	22.54329	303.7808	278.733	122.643	0	70.51381	6.464733	8.219759
SWLSW2R1HK	189.9031	183.3015	10.61421	40.56731	1.365099	4560.627	0	256.5763	11.29386	3.323062
SWLSW2R1FA	367.0123	174.4393	22.9758	151.5187	92.87297	58.80077	0	63.56253	50.59081	45.90233
SWLSW2R1KL	1322.807	528.0794	101.5414	1061.821	391.6904	146.8149	0	613.1461	451.7342	757.512
SWLSW2R1CV	1.964474	1510.146	78.15244	1826.438	2726.841	39.22716	0	179.9893	564.3441	1540.325

Table A. 25: MSE result when the magnitude of outlier is 1, $\rho = 0.95$ and $\sigma^2 = 1$.

	σ^2=1		$\delta^2 = 1$	$k = 1$						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	25.82383	41.19524	3.39362	6.228496	2.730412	14.63984	23.64717	19.13465	8.864903	5.409046
SR1HK	5.758791	4.410425	2.754969	3.556645	2.844743	1.045827	2.888539	1.808987	1.294345	1.158666
SR1FA	4.348275	4.94431	3.525389	4.628973	3.241198	2.01143	2.152658	1.957401	1.791798	1.599787
SR1KL	5.761378	6.168717	3.613584	5.375132	3.792557	1.543353	2.924016	2.431616	2.258323	2.143112
SR1CV	10.91812	13.24478	4.961022	8.346139	5.143279	6.776569	12.48514	5.665428	5.715523	4.552602
SWLSWOR1HK	1.326869	0.925682	2.144435	0.801574	0.944421	2.464139	2.297028	2.042325	1.023849	0.539005
SWLSWOR1FA	0.752025	0.934862	1.949109	0.703789	0.93245	2.682114	1.036066	2.303891	1.040359	0.598706
SWLSWOR1KL	1.383278	1.399016	3.326527	1.234678	1.491792	1.836601	1.608948	2.833803	1.259563	0.497599
SWLSWOR1CV	1.308438	2.294525	2.968775	1.290909	1.308328	0.490327	1.092442	3.470223	1.288378	0.712415
SWLSW2R1HK	1.186263	1.17137	0.989041	1.242876	0.899537	0.474939	0.802435	1.058473	1.030959	1.059284
SWLSW2R1FA	1.168542	1.14938	0.98337	1.375423	0.969561	0.490951	0.814399	1.044711	1.049998	1.093898
SWLSW2R1KL	1.459211	1.445502	1.054078	1.819894	1.231254	0.491755	0.782851	1.166763	1.205735	1.342243
SWLSW2R1CV	1.423904	1.661653	1.113554	2.225666	1.445339	0.495188	0.764618	1.213781	1.282488	1.45851

Table A. 26: MSE result when the magnitude of outlier is 5, $\rho = 0.95$ and $\sigma^2 = 1$.

	σ^2=1		$\delta^2 = 1$	k= 5						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	279.4719	547.6205	60.3767	112.2528	51.77151	349.9056	167.2501	301.0641	158.3323	106.5982
SR1HK	3.174033	5.840844	2.222257	2.811384	1.832621	1.601887	0	1.408567	0.982642	1.276001
SR1FA	6.601659	10.4373	5.964909	8.155469	5.651904	3.278296	0	3.729393	3.076556	5.728794
SR1KL	9.652775	16.24524	7.655848	15.40908	12.95489	3.597518	0	7.177803	7.879547	12.79478
SR1CV	10.75399	107.6259	15.674	34.21896	21.27025	7.337256	0	27.2183	28.08082	36.59578
SWLSWOR1HK	1.507792	0.685241	1.294774	0.766316	0.833154	0.947071	0	1.304911	1.019853	0.887103
SWLSWOR1FA	1.969421	2.356708	1.573873	0.589988	0.805128	3.08236	0	2.539198	1.099747	0.929809
SWLSWOR1KL	4.937471	3.830652	4.015298	2.785208	1.733519	2.393518	0	4.460027	2.307031	2.170286
SWLSWOR1CV	2.996997	45.8615	4.007882	3.009004	1.304813	0.794405	0	3.729363	1.932193	1.488185
SWLSW2R1HK	1.212123	1.49219	1.016636	1.136144	0.91282	1.165264	0	1.028262	1.018533	1.040409
SWLSW2R1FA	1.222415	1.898541	1.04778	1.728357	1.287696	1.058808	0	1.091856	1.145473	1.255976
SWLSW2R1KL	1.880692	4.446461	1.547105	4.283649	4.065171	1.151041	0	1.659685	2.199902	3.683377
SWLSW2R1CV	1.671325	1.953051	1.69814	8.102978	6.990758	0.812509	0	1.768834	2.989072	5.344174

Table A. 27: MSE result when the magnitude of outlier is 1, $\rho = 0.95$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	$k = 1$						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	841.4762	353.8744	10.41818	59.47076	18.33196	69.42589	206.1847	170.0379	59.702	36.4549
SR1HK	4.572612	4.573143	2.633202	2.921521	2.276192	7.082772	2.742569	2.114391	1.144724	1.155824
SR1FA	11.34034	8.454695	4.101063	6.461481	4.089798	3.420255	3.750662	3.568939	2.407864	3.227389
SR1KL	18.82696	12.99674	4.516105	10.63005	6.86326	6.812088	3.777734	5.757177	4.152095	5.712755
SR1CV	312.5708	28.8258	6.505675	17.46516	10.81024	6.461521	21.01178	11.94736	12.99011	14.53161
SWLSWOR1HK	1.970309	0.849671	0.833274	0.999204	1.006673	0.847387	0.691157	1.201972	0.993913	1.010252
SWLSWOR1FA	1.878632	0.71754	0.925007	0.99619	0.997459	0.781442	0.718658	1.607597	0.993952	1.007398
SWLSWOR1KL	2.018036	1.024758	0.686275	1.153591	1.074405	0.825979	0.793398	1.897248	0.995924	1.205945
SWLSWOR1CV	6.266542	1.222904	0.810057	1.061661	1.030362	0.801262	0.744299	3.661596	1.037189	1.076761
SWLSW2R1HK	1.384423	1.563023	0.942487	1.01945	0.866868	4.202728	0.738967	1.117843	1.006603	0.994946
SWLSW2R1FA	2.873107	1.375626	0.956957	1.296286	0.923696	1.404104	0.772132	1.121023	1.086179	1.037061
SWLSW2R1KL	4.110823	2.455479	1.036929	2.347264	1.279058	2.3436	0.82737	1.478009	1.447383	1.504132
SWLSW2R1CV	1.403355	2.885972	1.105122	4.415981	1.737948	1.518523	0.78497	1.696838	1.634372	1.818828

Table A. 28: MSE result when the magnitude of outlier is 5, $\rho = 0.95$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	k = 5						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	2350.055	3396.892	180.2293	847.4789	363.9542	623.2816	1392.116	2251.034	1012.893	688.4754
SR1HK	10.25481	3.161855	1.896998	1.686535	1.133647	5.6519	2.512092	1.385262	0.857395	1.017827
SR1FA	16.60408	12.39743	7.355536	11.46743	8.768725	4.371122	8.050573	6.915462	5.325856	10.23679
SR1KL	73.63738	35.19224	11.03171	34.13583	37.89511	14.55894	10.64535	18.62323	20.49479	25.79193
SR1CV	104.0724	155.1418	28.58156	131.9739	94.79384	3.916164	1.807043	88.82319	97.25453	145.8482
SWLSWOR1HK	1.309025	0.906777	0.899454	0.997157	0.992465	0.962894	0.926271	1.083413	0.995658	1.002434
SWLSWOR1FA	2.07752	0.90646	0.970792	0.975731	0.98766	1.233577	1.471515	2.195195	0.999018	1.009038
SWLSWOR1KL	3.12765	2.06716	0.835313	1.291007	1.170208	1.627224	1.859853	3.659764	1.288448	1.601574
SWLSWOR1CV	10.42538	1.939681	0.920245	1.112546	1.109895	1.563364	0.824116	7.111905	1.779165	1.268199
SWLSW2R1HK	1.226985	1.228951	0.975114	1.004119	0.967955	2.935463	0.734791	1.068706	1.004072	1.000386
SWLSW2R1FA	1.262242	1.821509	1.025035	1.868203	1.100261	1.342454	0.678485	1.307557	1.288632	1.131997
SWLSW2R1KL	2.592619	6.983733	1.594732	7.325214	5.176593	1.988677	0.669245	3.230477	3.577069	4.996789
SWLSW2R1CV	1.218008	12.23321	2.288284	23.94594	14.01959	1.49029	0.704147	4.117921	7.024915	11.66609

Table A. 29: MSE result when the magnitude of outlier is 1, $\rho = 0.95$ and $\sigma^2 = 25$.

		$\sigma^2 = 25$	$\delta^2 = 1$	k = 1						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	999.2906	358.3931	56.37191	142.0389	41.97131	387.6867	368.5126	314.2485	147.7398	85.28695
SR1HK	169.4585	41.69195	6.692057	11.45064	4.064874	34.02895	17.05879	24.07891	8.261846	7.558231
SR1FA	7.409559	11.70415	5.197951	7.715189	4.60749	5.584959	5.675475	4.437064	2.987142	4.213477
SR1KL	106.3529	43.27533	12.44088	28.40403	13.46778	32.1801	19.9659	33.91449	24.39837	24.81982
SR1CV	127.868	15.39606	13.77282	56.2332	16.84552	8.230272	46.76965	31.19758	26.685	25.28052
SWLSWOR1HK	637.7599	90.28983	35.04081	36.89191	11.2632	753.499	124.7182	185.6304	15.13417	15.89702
SWLSWOR1FA	52.95457	21.18143	12.76537	14.49789	3.095251	69.00091	15.68515	41.0274	6.46407	6.000072
SWLSWOR1KL	21.9857	57.94018	27.61243	37.87718	24.59528	19.28262	17.75715	40.65888	21.98137	30.46011
SWLSWOR1CV	23.36721	1.055089	20.15915	33.48221	6.530388	22.57577	26.49186	22.68004	9.458208	5.83856
SWLSW2R1HK	91.56493	8.862656	13.57726	39.6624	15.78385	253.4587	3.172306	23.41467	11.61188	16.64781
SWLSW2R1FA	24.48176	11.42317	5.402387	14.77578	18.77948	7.279927	1.158223	4.584716	4.978862	8.988244
SWLSW2R1KL	18.46095	14.09471	9.734673	38.12254	35.80291	16.84066	5.102813	13.74987	15.62662	32.62797
SWLSW2R1CV	83.09508	4.080932	10.4813	22.0098	54.0789	2.169201	0.915661	11.09656	14.96881	34.94179

Table A. 30: MSE result when the magnitude of outlier is 5, $\rho = 0.95$ and $\sigma^2 = 25$.

	$\sigma^2 = 25$		$\delta^2 = 1$	k = 5						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	4254.415	4186.674	735.8582	1745.721	633.529	1934.47	1853.756	3551.762	2091.73	1401.845
SR1HK	82.53714	34.92163	7.943179	14.64969	2.279594	0.548256	0	22.77494	6.8171	9.482253
SR1FA	14.23108	16.6088	9.356415	14.01258	9.98952	8.721672	0	9.323743	7.001875	12.71421
SR1KL	191.9935	115.1209	50.08693	149.96	89.12795	7.09252	0	123.2954	112.1201	166.962
SR1CV	122.5255	315.5223	68.07826	396.8408	127.2811	37.20354	0	150.3441	171.5684	243.5474
SWLSWOR1HK	388.9212	96.86572	31.57733	7.942881	2.515964	551.8002	0	176.0305	14.2311	10.14939
SWLSWOR1FA	144.4925	117.3323	19.18629	12.80468	4.283144	245.6331	0	106.3321	12.66228	12.1343
SWLSWOR1KL	87.29544	121.0331	64.75244	79.25239	57.01757	72.00805	0	181.1637	85.90003	126.4048
SWLSWOR1CV	2.308975	6.050675	64.70402	245.7337	27.47254	0.500283	0	40.44871	54.84632	18.21763
SWLSW2R1HK	42.91775	44.48553	8.378344	48.10802	7.110496	1.254372	0	19.91617	8.901807	16.2302
SWLSW2R1FA	24.40306	12.79845	9.21996	47.80912	54.03376	0.952864	0	7.622347	12.11615	27.27059
SWLSW2R1KL	33.11892	107.1477	32.60534	271.9555	183.6969	1.29713	0	48.35504	68.82	186.8419
SWLSW2R1CV	60.45934	4.518249	41.07988	411.949	441.801	0.376367	0	20.75008	75.03912	232.8756

Table A. 31: MSE result when the magnitude of outlier is 1, $\rho = 0.95$ and σ^2=25.

	$\sigma^2 = 25$		$\delta^2 = 2$	k = 1						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	19070.05	6731.915	220.2151	1329.063	413.8749	1619.763	4894.754	3799.145	1346.352	788.5684
SR1HK	22.19957	49.93614	7.620291	14.55599	2.441126	142.4112	13.48932	34.32779	7.434141	4.71696
SR1FA	32.27764	28.64762	7.152921	12.25537	8.491227	10.65601	27.79435	14.88065	7.012864	9.535554
SR1KL	262.3699	177.139	24.42714	116.6333	47.81356	127.3616	55.13656	127.7677	71.25457	79.34394
SR1CV	1373.614	109.0771	25.79331	138.1376	81.73082	73.47104	146.1919	84.43648	110.9672	130.4444
SWLSWOR1HK	2.237911	9.054998	1.262992	1.104371	0.96711	40.85896	9.973661	40.85632	1.099548	1.034381
SWLSWOR1FA	2.654318	15.18621	1.194072	1.085151	0.900644	20.25263	11.8126	19.57059	1.312897	1.053176
SWLSWOR1KL	8.826037	34.36524	2.776766	3.787568	2.615952	11.37165	15.79037	32.09558	4.964459	4.503378
SWLSWOR1CV	311.9626	0.992696	3.862599	2.330158	3.023474	2.331147	1.171923	11.826	7.69824	2.725142
SWLSW2R1HK	64.37592	241.1251	2.812416	22.39734	1.45255	2531.653	0.843587	63.59243	6.65706	3.758545
SWLSW2R1FA	84.50529	64.2909	6.417462	35.72023	14.56723	35.45163	1.027874	11.49247	9.991913	10.10001
SWLSW2R1KL	109.9125	163.0651	8.918539	92.5074	30.29371	50.49576	1.977948	39.60996	32.80991	50.93374
SWLSW2R1CV	23.04431	182.4114	10.43083	246.8419	125.6473	6.311749	0.765879	31.94207	54.65063	89.72328

Table A. 32: MSE result when the magnitude of outlier is 5, $\rho = 0.95$ and σ^2=25.

	$\sigma^2 = 25$		$\delta^2 = 2$	k = 5						
$\rho = 0.95$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	80790.99	94589.88	3282.983	19670.99	7646.277	8251.99	41604.27	45771.11	21663.91	14113.22
SR1HK	11.68134	21.52023	7.737589	7.7658	1.150685	0.840579	39.03801	24.73124	3.881018	2.167293
SR1FA	15.33335	22.78129	11.05954	15.59482	13.88111	15.75019	31.07223	19.45183	11.91246	19.25302
SR1KL	377.7424	741.081	100.0126	568.0727	246.4265	26.6785	135.7976	459.1654	302.29	413.867
SR1CV	614.4763	1221.404	139.1046	1569.43	851.5546	92.101	2.256119	506.7677	643.0686	1307.31
SWLSWOR1HK	7.488096	3.285674	1.147239	1.131497	0.974947	4.50099	65.3483	24.21517	1.035043	1.002144
SWLSWOR1FA	12.06446	24.99048	1.750367	1.07994	0.830412	5.360125	27.55443	53.52041	1.785369	1.102306
SWLSWOR1KL	128.3199	56.98643	7.845284	10.41946	9.256449	2.012453	98.33896	118.9652	21.91823	19.15538
SWLSWOR1CV	2.288561	17.459	32.23824	64.31486	21.39099	0.479667	1.450298	14.88856	40.4135	12.28207
SWLSW2R1HK	5.258934	84.98053	2.381704	7.854622	0.987317	4.556851	0.877776	27.16237	2.959068	1.732358
SWLSW2R1FA	120.2837	56.3191	10.74222	55.39465	26.46604	4.351105	1.196502	22.21744	23.09389	19.92719
SWLSW2R1KL	168.5805	319.6771	29.08237	284.9898	85.4073	4.469297	7.679762	179.0701	132.0264	228.7876
SWLSW2R1CV	1.409053	135.5718	55.44491	900.0186	922.1003	0.499251	0.703003	76.61312	221.686	630.7708

Table A. 33: MSE result when the magnitude of outlier is 1, ρ = 0.95 and σ^2=100.

	σ^2= 100	δ^2 = 1	k = 1							
ρ = 0.95			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	1949.825	1392.281	167.5946	425.7147	290.9479	1151.681	1497.892	1219.32	572.632	326.2483
SR1HK	346.6516	134.8608	31.07836	27.66256	14.10559	56.71968	54.33464	96.51299	32.66237	26.95933
SR1FA	11.52074	18.44282	9.136932	10.94641	15.51026	8.361565	10.90922	7.870482	4.728776	6.702023
SR1KL	211.0057	144.5116	43.30536	79.24802	116.4486	66.01981	75.8711	134.748	97.22711	93.44324
SR1CV	122.1406	27.02117	19.33258	88.93317	118.1333	16.93453	80.33363	79.41839	69.75775	66.86249
SWLSWOR1HK	6630.912	1071.862	545.5354	367.889	42.1374	4344.806	1796.885	2844.114	211.3897	206.8851
SWLSWOR1FA	261.5044	113.2186	77.02127	57.28141	14.4084	557.128	96.88981	268.4442	31.34092	33.15812
SWLSWOR1KL	71.23787	132.1938	101.2444	137.4829	71.68407	62.79932	50.34487	179.5702	119.9618	188.0124
SWLSWOR1CV	14.8783	2.861217	174.8401	44.31971	1.23731	0.789727	13.64702	77.66305	44.00586	21.61162
SWLSW2R1HK	573.0414	307.753	337.2965	567.1959	245.7848	3928.566	12.53032	308.9738	176.0165	234.6082
SWLSW2R1FA	78.43978	130.5882	37.22297	121.1326	162.2887	75.76724	2.300704	26.56655	27.59217	55.598
SWLSW2R1KL	80.28067	138.6021	61.53856	280.0032	390.1929	51.01151	14.33795	76.46323	98.22353	227.9628
SWLSW2R1CV	206.8272	2.373267	3.359275	202.8553	323.2047	21.92522	0.917308	50.97149	77.84794	204.6144

Table A. 34: MSE result when the magnitude of outlier is 5, ρ = 0.95 and σ^2=100.

	σ^2 = 100	δ^2 = 1	k = 5							
ρ = 0.95			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	8139.562	18505.19	2128.833	7784.265	2378.37	6280.245	6539.082	13354.63	7906.36	5232.164
SR1HK	124.7881	122.7695	118.2376	52.65245	5.202255	0.535945	0	95.23613	26.66918	35.8969
SR1FA	13.46312	18.56905	14.05987	17.11969	12.18234	15.59545	0	14.73528	10.00738	16.77403
SR1KL	281.571	557.4442	341.2578	536.0495	317.6206	17.54464	0	494.3344	442.3108	630.9956
SR1CV	148.132	617.9035	18.43332	1251.73	337.361	68.33625	0	362.349	404.9384	635.7097
SWLSWOR1HK	6791.035	1333.997	808.7749	161.1982	26.75202	9409.322	0	2866.857	207.9051	152.2035
SWLSWOR1FA	380.9598	402.8421	71.41058	67.95944	23.78257	1715.999	0	664.888	59.07534	60.7976
SWLSWOR1KL	174.5393	560.0543	570.8628	399.5098	284.6152	191.6164	0	1022.185	461.7327	757.1683
SWLSWOR1CV	1.313162	82.49106	1.487212	1377.863	155.2451	0.500192	0	105.5145	203.7043	74.2459
SWLSW2R1HK	893.3656	907.9743	527.202	1037.255	93.27301	15.75251	0	300.7469	121.9026	266.5898
SWLSW2R1FA	72.39676	49.32949	120.3136	247.6786	278.8723	5.74721	0	42.73915	63.76556	149.7683
SWLSW2R1KL	159.2002	394.9789	431.1504	1820.453	1044.3	10.29859	0	304.8137	435.9435	1318.282
SWLSW2R1CV	115.8486	35.11156	7.628445	2037.194	1997.062	0.664786	0	79.02219	297.6182	968.1664

Table A. 35: MSE result when the magnitude of outlier is 1, ρ = 0.95 and σ^2=100.

	σ^2 = 100	δ^2 = 2	k = 1							
ρ = 0.95			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	75328.53	47248.16	902.2884	4906.749	1608.822	6828.32	22468.46	15011.39	5334.685	3106.076
SR1HK	94.53431	193.5367	23.2148	49.87258	5.051639	651.0225	25.69465	140.3392	28.24638	15.92879
SR1FA	47.54084	43.37565	9.283324	16.98486	11.11965	13.98713	57.23163	28.37241	11.70952	14.26548
SR1KL	1004.263	1033.356	87.41775	434.7779	175.2829	550.201	170.5111	518.3868	287.0049	305.3558
SR1CV	2330.588	115.3565	51.44451	321.2626	215.057	35.40893	244.7179	187.253	268.4524	349.1784
SWLSWOR1HK	9.403005	110.7806	4.069445	3.046089	0.936609	302.8976	109.5347	630.041	2.78825	1.449327
SWLSWOR1FA	4.25434	102.8518	3.414833	2.036184	0.95865	57.31945	47.82272	116.7622	2.913133	1.591332
SWLSWOR1KL	27.21612	141.612	10.85948	18.81102	11.71434	14.91115	57.42256	175.2881	29.63012	25.47362
SWLSWOR1CV	834.8236	2.826814	4.425547	76.19881	15.50761	533.867	5.459244	21.01613	35.58101	10.99293
SWLSW2R1HK	1019.053	4254.827	30.21708	382.7175	6.15042	95109.25	6.06756	1057.665	100.8004	44.35037
SWLSW2R1FA	474.739	275.4844	38.28788	191.8423	85.40017	321.0916	7.644554	70.34966	56.61555	58.81591
SWLSW2R1KL	674.7926	612.8017	49.01609	603.0582	152.8992	218.2664	25.39511	243.9199	213.6247	357.986
SWLSW2R1CV	86.39468	239.9679	38.47058	929.9931	622.2283	27.56381	0.819603	119.3714	220.8756	428.4253

Table A. 36: MSE result when the magnitude of outlier is 5, ρ = 0.95 and σ^2=100.

		σ^2 = 100		δ^2 = 2	k = 5					
ρ = 0.95				p = 3					p = 6	
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	160832.4	497221.7	7144.786	66667.86	30138.33	47159.72	170356.7	178855.7	85406.04	55237.64
SR1HK	204.7277	74.71619	54.6752	27.53628	1.572812	411.3372	141.1428	104.8732	13.87278	6.053326
SR1FA	22.59397	31.48894	12.79498	17.68374	15.23428	14.29062	43.59115	28.48769	15.14452	22.74871
SR1KL	2198.925	3152.707	458.6342	2220.523	863.0537	1095.841	480.9819	1870.087	1186.753	1612.295
SR1CV	116.4844	3342.569	59.70453	2255.512	2226.118	14.88207	2.57696	976.8057	1354.691	3137.265
SWLSWOR1HK	2662.734	20.88809	19.05046	5.173929	0.954145	1362.227	1031.674	369.9986	1.710902	1.208858
SWLSWOR1FA	193.3638	123.6902	6.080452	2.150551	1.006967	381.3796	132.9854	305.1733	5.124741	2.194634
SWLSWOR1KL	347.5972	405.531	43.34077	51.90992	39.86561	355.7314	514.762	642.156	125.4605	125.1533
SWLSWOR1CV	10.95935	8.686531	5.991879	366.8695	121.6107	67.25375	20.17789	28.57928	166.3841	48.27982
SWLSW2R1HK	4278.03	542.4113	62.03952	88.02919	1.235642	26781.14	5.532105	463.2632	28.62045	14.26207
SWLSW2R1FA	252.5641	313.1704	50.1211	244.2598	127.8171	216.2929	8.295669	117.1356	112.4033	98.65375
SWLSW2R1KL	1391.014	1531.731	162.6276	1584.955	307.5308	263.9652	46.72718	1166.311	781.4276	1299.928
SWLSW2R1CV	123.3266	448.0669	20.06209	1788.819	3434.155	34.5655	0.719794	250.4239	758.4709	2385.87

Table A. 37: MSE result when the magnitude of outlier is 1, ρ = 0.99 and σ^2 = 1.

		σ^2=1		δ^2 = 1	k = 1					
ρ = 0.99				p = 3					p = 6	
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	127.6661	143.53789	15.42542	31.45909	10.9140423	92.27772	72.52779	104.3742	41.82327	24.1967
SR1HK	10.10588	6.2340661	3.219232	3.947399	2.89505561	8.819169	3.47098	4.706753	2.516189	2.636771
SR1FA	4.902072	5.5113118	3.91678	5.435665	3.62218861	2.980695	2.125181	2.638054	2.092144	2.716893
SR1KL	5.262594	5.9187306	3.815244	5.555074	3.83763838	3.327364	2.127457	3.490848	3.061057	4.030286
SR1CV	11.81537	12.749365	7.89777	18.48818	10.0928264	7.060171	19.35536	13.4594	16.12756	14.5251
SWLSWOR1HK	7.076677	10.257121	2.182707	2.753722	0.8119612	11.36968	8.053991	3.073084	1.282677	0.73101
SWLSWOR1FA	1.889667	6.4538036	2.353214	2.918321	1.16618838	1.844262	1.271164	2.196311	1.23563	0.522414
SWLSWOR1KL	3.467194	7.3572001	3.456756	4.54719	1.35789803	1.703835	1.948179	2.811451	1.77376	1.161369
SWLSWOR1CV	5.148283	13.739083	3.556805	4.57924	1.49947876	1.552088	1.7988	2.271238	1.954922	1.470383
SWLSW2R1HK	2.515197	3.4751469	1.10043	1.438662	1.0891799	1.909933	1.055567	1.293039	1.246554	1.237097
SWLSW2R1FA	1.325601	1.5202996	1.055813	1.526466	1.22830519	1.193395	0.986117	1.13642	1.167351	1.229904
SWLSW2R1KL	1.848679	2.2667718	1.217486	2.168134	1.69920176	1.586713	1.102166	1.491013	1.697145	1.985962
SWLSW2R1CV	2.080302	1.9523779	1.492217	4.445579	2.7876397	1.213693	1.11421	1.514761	2.25772	2.91484

Table A. 38: MSE result when the magnitude of outlier is 5, ρ = 0.99 and σ^2 = 1.

		σ^2=1		δ^2 = 1	k= 5					
ρ = 0.99				p = 3					p = 6	
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	1659.391	1481.7961	257.9108	486.6457	193.008118	924.6522	474.3652	1631.081	712.0266	460.624
SR1HK	5.081102	8.9726289	3.097479	4.72852	2.30253099	8.656189	14.49336	4.323287	2.075624	2.558239
SR1FA	10.07405	14.676571	8.520554	14.08502	10.1987824	4.221393	4.579544	6.591448	5.280892	10.81596
SR1KL	10.68134	17.752484	8.171925	17.87654	12.0588277	7.723548	9.790621	11.36261	9.563052	16.46367
SR1CV	17.03242	41.489493	35.45593	91.8371	60.1075458	10.31988	20.39933	95.64058	102.5876	128.2426
SWLSWOR1HK	6.130253	15.692044	1.531952	1.421475	0.9211716	9.106306	1.783352	2.17376	1.274125	0.869948
SWLSWOR1FA	4.302639	15.590721	2.016482	2.202517	1.12747711	3.667873	1.267305	3.370565	2.059572	0.852166
SWLSWOR1KL	8.140939	19.898473	4.626251	5.228887	2.37358665	4.431802	2.325657	6.317732	5.477055	4.680315
SWLSWOR1CV	7.127797	18.361196	5.85749	8.509535	3.68098415	1.469741	1.001531	3.725152	6.836886	7.309985
SWLSW2R1HK	3.949981	1.3429103	1.040431	1.314221	1.03797094	1.753702	0.908993	1.252079	1.108944	1.175742
SWLSW2R1FA	1.485849	1.990564	1.168096	2.525206	2.22886825	1.187557	0.912928	1.268437	1.360141	1.89791
SWLSW2R1KL	2.950233	2.8714301	1.696634	4.456722	4.43048692	1.529836	0.982159	2.677186	3.311324	5.650839
SWLSW2R1CV	1.278059	2.3785026	2.816813	12.22125	17.0264131	1.243873	0.913345	2.721865	7.04383	19.71016

Table A. 39: MSE result when the magnitude of outlier is 1, $\rho = 0.99$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	$k = 1$						
$\rho = 0.99$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	808.4389	2174.3502	48.84546	303.6173	76.4078836	295.7185	784.7439	1060.703	266.3795	168.2606
SR1HK	10.57222	10.854927	2.945329	4.405273	2.30821031	20.42494	5.395167	5.593923	2.263471	1.956614
SR1FA	8.238148	13.370952	4.885006	10.14482	5.84508578	3.717704	5.249772	5.767527	3.102673	5.34438
SR1KL	9.040881	19.753963	4.615442	12.75191	6.46162122	6.669903	5.685967	8.930663	5.136429	7.299053
SR1CV	32.27095	15.389762	12.79373	33.98492	27.6512787	10.83246	24.12031	25.38623	39.90613	48.1624
SWLSWOR1HK	1.218313	5.662085	1.123322	0.882201	0.92762418	8.954689	1.032656	1.412861	0.98879	0.996308
SWLSWOR1FA	1.267529	2.018241	1.132533	0.876928	0.9768692	2.736584	1.12851	1.424615	0.995665	0.989594
SWLSWOR1KL	1.68178	3.3301596	1.489919	0.814249	0.77003208	1.836955	1.065942	2.089081	1.254548	1.110258
SWLSWOR1CV	1.935012	4.5138046	1.254277	1.00839	0.85194411	1.6843	1.001685	1.164436	1.082351	1.007606
SWLSW2R1HK	2.172247	3.6558742	0.946551	1.064336	0.87394651	6.687954	0.933125	1.592683	1.159382	1.049119
SWLSW2R1FA	2.92305	1.522377	1.003087	1.723881	1.03973594	1.6178	0.938284	1.307475	1.261045	1.190337
SWLSW2R1KL	3.008249	3.2001171	1.094926	2.458503	1.49630241	2.688646	1.080377	2.218634	1.981719	2.218941
SWLSW2R1CV	3.24204	4.2184304	1.418298	8.187676	3.71271509	1.49016	1.056227	2.47768	4.171861	4.903926

Table A. 40: MSE result when the magnitude of outlier is 5, $\rho = 0.99$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	k = 5						
$\rho = 0.99$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	12904.86	33630.163	767.5325	4813.744	1391.39814	2351.233	4333.814	13751.77	4329.779	3081.567
SR1HK	30.66227	8.4075891	2.423757	3.527341	1.27788253	19.62513	2.793325	5.353015	2.012218	1.453424
SR1FA	27.43481	34.48934	12.70923	28.39302	25.9040909	5.782618	10.52805	17.5762	13.03925	27.59098
SR1KL	93.87784	78.992853	11.59426	60.43918	37.5145291	17.01014	10.09708	40.23654	26.22496	33.47376
SR1CV	39.38078	205.2569	69.58878	348.2497	285.571382	12.92804	37.8555	233.9353	300.8887	527.8465
SWLSWOR1HK	2.025613	2.4362804	1.071912	0.962591	0.9806397	3.883514	1.217092	1.304086	1.02179	1.000588
SWLSWOR1FA	3.185419	4.358809	1.102813	0.908688	0.98836879	4.482928	2.253726	2.374041	1.146011	1.016587
SWLSWOR1KL	8.352213	10.953973	1.919681	1.657718	1.07910097	2.729034	2.205023	5.258696	3.116991	1.938894
SWLSWOR1CV	15.72276	2.3083407	1.789396	3.810252	1.00253065	2.967328	1.13423	3.321571	1.938242	1.121746
SWLSW2R1HK	3.713129	1.6087142	0.978704	1.013057	0.97381971	5.906758	0.936341	1.433808	1.053686	1.012082
SWLSW2R1FA	3.234292	3.626219	1.284367	4.193593	2.14893095	1.642097	0.90479	2.018419	2.058217	2.018596
SWLSW2R1KL	13.81317	12.257446	1.711224	8.841144	5.16518476	2.710016	0.948021	5.878054	4.86268	6.547656
SWLSW2R1CV	1.671813	22.991008	4.056267	40.05868	36.7647862	1.49063	0.909863	7.75767	18.1827	38.56318

Table A. 41: MSE result when the magnitude of outlier is 1, $\rho = 0.99$ and $\sigma^2 = 25$.

		$\sigma^2 = 25$	$\delta^2 = 1$	k = 1						
$\rho = 0.99$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	15565.68	1847.1344	272.7699	502.1547	178.064546	1915.269	1894.615	1717.806	722.5572	390.2003
SR1HK	338.5779	77.830395	12.91782	16.89259	7.73776192	165.5045	28.53697	89.15379	38.75578	28.28897
SR1FA	23.12203	12.900972	7.587683	11.5672	7.92439537	6.719978	7.820545	6.829106	4.532217	7.495655
SR1KL	144.7974	35.407164	14.67084	29.34963	18.77708	38.81608	22.72889	51.80864	44.23141	48.63193
SR1CV	797.712	31.811689	36.01831	69.75492	47.4267859	29.36149	64.48426	73.70817	88.92094	91.57897
SWLSWOR1HK	32416.71	1418.2083	68.26178	39.48065	29.7406327	4647.695	1142.199	1064.794	200.5366	125.3431
SWLSWOR1FA	90.68086	224.63755	17.22636	22.86646	15.7215133	90.92952	50.1521	59.28532	32.49938	20.70544
SWLSWOR1KL	30.49234	115.36778	35.37418	39.321	40.0804021	27.7609	23.28482	38.01032	57.36084	73.10426
SWLSWOR1CV	11.12458	106.36494	30.98811	4.385868	35.8646118	9.816493	2.308615	14.51998	35.72298	51.81807
SWLSW2R1HK	7207.427	168.7523	41.55076	120.7667	37.7473679	393.5018	0.918383	145.647	83.56407	85.65007
SWLSW2R1FA	50.5638	26.256277	9.131346	34.43519	33.1083625	14.12368	0.895263	9.19815	8.890893	17.45498
SWLSW2R1KL	64.80218	31.898215	12.19507	42.01932	47.4625414	19.79924	1.010469	21.95751	30.05984	58.86795
SWLSW2R1CV	66.70738	10.989032	16.6509	70.61578	109.733369	4.392263	1.646894	14.77755	42.10383	98.82825

Table A. 42: MSE result when the magnitude of outlier is 5, ρ = 0.99 and σ^2 = 25.

		σ^2 = 25	δ^2 = 1	k = 5						
ρ = 0.99			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	59255.5	8686.2815	3439.462	6806.986	2903.68441	12839.46	9522.68	19002.54	9636.743	6097.519
SR1HK	181.1548	79.210092	18.69612	40.02313	10.7490516	209.3945	375.4772	103.3511	37.359	32.56285
SR1FA	26.5887	27.924399	21.41884	36.33459	34.9408885	11.88289	16.63781	23.73187	20.19768	38.47403
SR1KL	173.5488	95.115639	64.41269	183.1375	127.656715	122.3254	219.9557	201.2298	175.7242	245.0947
SR1CV	1410.159	7.3385646	142.3388	629.2305	373.072708	30.69807	259.0352	364.8383	566.6757	866.4252
SWLSWOR1HK	3922.778	2804.0616	115.9891	113.3386	9.59463834	4002.873	1190.577	1141.209	189.7729	94.68231
SWLSWOR1FA	231.5354	764.93133	25.93542	36.23919	24.6594427	234.9192	131.5045	179.7169	92.30869	54.0745
SWLSWOR1KL	445.5333	539.14447	113.9206	168.3337	84.1677329	129.2297	109.6419	241.3177	270.312	256.185
SWLSWOR1CV	1.939972	502.00277	75.7086	259.7879	31.0075192	5.643793	29.18365	24.02484	118.0281	245.8693
SWLSW2R1HK	878.9767	39.980357	28.80127	88.85639	37.0884756	356.5285	1.369793	131.9962	62.85843	94.75796
SWLSW2R1FA	43.34077	44.307315	22.86316	111.534	141.338136	14.10419	1.344272	21.10653	31.82963	92.70937
SWLSW2R1KL	96.04233	60.765399	49.28883	287.8711	267.937349	19.82666	3.389706	86.50971	139.2507	349.6027
SWLSW2R1CV	5.032583	16.703603	46.38501	413.2307	428.160126	5.619295	0.910467	25.37422	134.8383	642.7275

Table A. 43: MSE result when the magnitude of outlier is 1, ρ = 0.99 and σ^2=25.

		σ^2 = 25	δ^2 = 2	k = 1						
ρ = 0.99			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	53579.8	72353.994	1036.698	6375.459	1633.88531	7045.549	16009.1	23911.13	6087.991	3697.42
SR1HK	642.9098	188.4928	13.03636	40.95208	6.28762445	444.4784	63.24436	119.7666	35.83226	15.36971
SR1FA	85.0401	78.362992	14.2284	36.01532	24.4346791	13.1895	30.20417	33.58369	14.90791	24.64247
SR1KL	589.6452	376.90501	30.67231	170.7861	65.5421582	124.6165	78.94465	201.5643	111.1231	121.2833
SR1CV	390.8676	59.852893	67.01801	200.0736	229.736025	45.07157	84.68517	130.4799	289.4145	456.18
SWLSWOR1HK	188.7267	6125.1558	2.047972	2.536091	0.92359216	4210.568	65.58	124.2116	10.36691	2.702725
SWLSWOR1FA	51.00442	55.423901	2.305379	0.95332	0.8756595	79.28609	12.60571	28.16506	3.826698	1.982019
SWLSWOR1KL	40.75769	92.769772	4.962639	11.91691	3.76927825	11.55973	8.502005	41.32715	38.43227	21.36876
SWLSWOR1CV	74.07664	6.8516459	8.831927	13.26259	3.62180381	8.292719	2.246108	9.994343	5.378519	1.877571
SWLSW2R1HK	513.0642	1446.4524	8.226763	43.41887	3.99528479	2731.119	12.76767	271.4188	79.94808	24.5187
SWLSW2R1FA	156.3619	75.489367	17.43834	88.88094	42.2464573	54.67595	1.414389	26.43437	26.08222	30.37307
SWLSW2R1KL	180.3769	117.31947	12.38316	121.2413	47.2198659	52.23251	10.16294	68.12667	66.77118	102.1831
SWLSW2R1CV	82.11433	104.43868	19.19355	246.5705	293.257528	8.517236	0.893189	22.88619	103.7309	264.0213

Table A. 44: MSE result when the magnitude of outlier is 5, ρ = 0.99 and σ^2=25.

		σ^2 = 25	δ^2 = 2	k = 5						
ρ = 0.99			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	489495.7	319439.31	13969.51	92780.13	28688.2594	48714.09	135851.2	282234.2	93878.64	64318.62
SR1HK	93.15504	142.37812	16.41748	45.66442	2.84254313	482.3884	51.67216	147.4661	34.40765	9.709297
SR1FA	48.36355	60.543964	31.59542	60.12905	66.6631545	21.49168	56.74573	62.88159	43.15093	78.52983
SR1KL	424.891	589.38088	136.2932	1047.54	432.104657	356.0431	283.656	968.2777	579.7762	680.3727
SR1CV	681.1849	683.37682	247.5978	1376.596	2333.09675	51.05275	266.2027	974.665	1622.483	3631.035
SWLSWOR1HK	50.15249	119.42897	1.825435	2.338321	0.96504882	1516.282	51.15798	100.1232	6.089057	2.424488
SWLSWOR1FA	79.68157	180.87876	2.544444	1.145467	0.94417362	161.0905	111.2408	89.68149	7.128991	3.373859
SWLSWOR1KL	492.5029	154.32657	11.72647	32.40126	8.39745653	58.77404	95.52379	211.205	116.6533	82.83764
SWLSWOR1CV	2.009344	84.040467	24.45012	46.62055	24.5313757	18.16277	78.96951	38.9898	19.47203	4.327658
SWLSW2R1HK	145.795	438.23977	5.283273	26.93472	2.59434816	2313.567	13.26177	198.6712	35.39516	14.37941
SWLSW2R1FA	134.0714	93.82228	38.72202	214.6154	113.004202	50.82032	1.465721	81.29096	92.4254	104.2014
SWLSW2R1KL	241.3266	958.69281	38.0861	521.9785	156.244216	47.88119	4.618333	407.6982	328.2343	593.9847
SWLSW2R1CV	100.7465	204.369	113.1543	1072.693	1751.25545	9.288356	2.959314	103.995	373.8179	1055.767

Table A. 45: MSE result when the magnitude of outlier is 1, ρ = 0.99 and σ^2=100.

		σ^2= 100	δ^2 = 1	k = 1						
ρ = 0.99			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	60505	7198.9921	1044.528	1894.802	771.095055	7598.63	7702.419	6658.426	2810.557	1501.548
SR1HK	1348.309	461.86911	42.95441	66.55707	21.4924104	657.8781	13.26177	360.269	162.3918	109.0255
SR1FA	42.79704	30.778991	13.1989	19.44088	13.582168	12.78026	1.465721	14.46827	9.17628	14.78817
SR1KL	556.5819	159.17419	48.69835	115.1261	62.0359421	149.6671	4.618333	205.2244	177.7627	186.1716
SR1CV	396.0781	21.660696	78.29143	91.27973	165.317154	54.32445	2.959314	153.3504	231.1263	250.7178
SWLSWOR1HK	527595.3	27475.583	784.5354	338.6696	374.171269	75608.9	10739.99	16126.68	3087.08	1841.622
SWLSWOR1FA	442.6678	1880.0448	71.02996	81.28872	70.7062768	666.6164	339.6985	390.006	210.532	130.7796
SWLSWOR1KL	62.50424	197.59612	91.85254	105.738	179.507731	70.15079	55.91728	140.4074	254.4687	299.6879
SWLSWOR1CV	11.39273	58.83509	114.5569	3.901961	36.1547882	29.18307	4.747707	52.98129	133.0862	212.8628
SWLSW2R1HK	92461.7	7992.839	498.074	1936.23	432.893207	6378.675	1.18177	2579.725	1312.795	1238.262
SWLSW2R1FA	573.014	257.57999	65.64663	293.39	253.747578	97.53185	1.040027	58.59876	57.50459	134.7004
SWLSW2R1KL	497.6182	121.68478	68.03424	310.4193	294.522328	71.11791	1.357277	98.75879	137.9389	327.5414
SWLSW2R1CV	50.25702	21.996411	63.04117	263.678	564.666986	14.00472	0.956682	38.70245	131.1265	408.7938

Table A. 46: MSE result when the magnitude of outlier is 5, ρ = 0.99 and σ^2=100.

		σ^2 = 100	δ^2 = 1	k = 5						
ρ = 0.99			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	220007.7	73029.734	12499.36	37068.47	9086.28934	49582.99	40904.99	71092.37	36542.03	22905.19
SR1HK	824.7254	287.86701	60.81263	178.4093	35.3804655	801.2065	1784.746	426.0741	155.2175	126.3358
SR1FA	33.66125	50.318101	30.96339	56.20418	52.4304079	21.58759	32.64714	42.86901	33.89152	61.32737
SR1KL	637.7376	418.32468	227.7356	730.8064	467.492314	472.9546	942.2416	799.256	700.7971	939.0375
SR1CV	1268.663	335.91728	252.4465	1398.403	1082.53907	60.09886	463.6549	690.0098	1185.437	2074.021
SWLSWOR1HK	72305.55	28867.484	1347.807	447.4579	216.861405	63681.82	20730.45	17936.34	2955.556	1518.204
SWLSWOR1FA	1348.799	4156.2459	112.6948	197.7995	169.045069	1741.569	1299.385	1209.867	579.2967	373.0256
SWLSWOR1KL	951.6011	994.94199	401.2801	468.5435	449.1028	417.123	825.0874	1123.253	1625.097	1393.432
SWLSWOR1CV	1.961331	331.09298	204.9479	19.97205	1158.42448	20.13071	136.537	76.92164	355.6294	731.3786
SWLSW2R1HK	14299.33	3620.329	411.8529	1455.109	568.79159	5649.617	6.965937	1945.719	945.6225	1438.886
SWLSW2R1FA	339.9849	220.83909	141.3675	938.271	886.096396	102.4266	3.236044	140.5705	210.6395	605.5776
SWLSW2R1KL	591.6024	231.89288	283.1643	1962.051	1909.35418	70.59105	17.4904	533.9462	935.5083	2638.096
SWLSW2R1CV	4.565488	29.082945	200.0139	814.0359	2120.81391	20.06632	0.910908	72.355	395.3366	2301.318

Table A. 47: MSE result when the magnitude of outlier is 1, ρ = 0.99 and σ^2=100.

		σ^2 = 100	δ^2 = 2	k = 1						
ρ = 0.99			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	172336.6	218741.53	4242.087	25150.33	5011.94582	28149.79	84947.62	94550.78	24165.36	14593.74
SR1HK	470.2594	751.15897	47.50235	153.135	23.9609564	1783.421	314.2175	498.3265	148.2957	57.45379
SR1FA	63.1723	143.45435	22.64929	58.68919	37.0752194	26.9262	100.2111	72.4486	29.15507	43.91493
SR1KL	497.3289	1475.7868	104.9358	650.9362	243.017644	494.4681	433.0896	814.835	456.5624	476.1985
SR1CV	137.4032	231.96195	149.6245	478.7332	509.018905	78.03972	199.608	252.2819	629.945	1123.109
SWLSWOR1HK	1393.646	16758.596	7.290343	24.42032	2.13872798	76579.72	17276.64	1897.272	146.9472	29.48846
SWLSWOR1FA	195.6635	530.59433	4.951248	2.63386	1.10218344	467.5413	146.2743	169.5054	15.17897	6.863375
SWLSWOR1KL	104.2519	783.07619	13.89462	57.64919	12.8660205	45.81535	56.20922	201.8987	210.29	142.2225
SWLSWOR1CV	37.1562	31.053324	21.23818	83.15298	1.45162203	15.47272	6.33476	39.53452	15.39891	4.204906
SWLSW2R1HK	902.4065	37091.325	78.83216	693.7237	14.82996	40850.83	83.56392	4632.253	1204.426	366.6573
SWLSW2R1FA	441.3653	781.37462	101.6863	572.4118	276.430336	363.3508	1.600977	181.5895	190.041	220.9747
SWLSW2R1KL	666.8833	1339.1467	61.86997	836.1784	275.346571	190.2771	40.62979	416.202	438.3125	767.3722
SWLSW2R1CV	70.84821	837.15616	90.566	962.2791	985.213449	39.03291	6.657362	80.80906	314.4916	917.984

Table A. 48: MSE result when the magnitude of outlier is 5, ρ = 0.99 and σ^2=100.

		σ^2 = 100	δ^2 = 2	k = 5						
ρ = 0.99			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	989187.2	1828907.6	59289.9	362444.6	117667.956	193791	560380.2	1103511	370911.1	252382.2
SR1HK	2742.033	673.23757	60.94123	174.0809	7.09745225	1914.115	212.1242	610.4262	140.792	35.52668
SR1FA	98.39934	118.36966	43.24139	72.94706	83.7956807	37.32913	97.23139	101.0499	62.03307	104.6876
SR1KL	7267.227	6198.7208	575.8652	4062.206	1595.68143	1410.079	1168.611	3883.586	2332.496	2683.527
SR1CV	174.1381	952.86958	312.3895	2973.628	5272.92742	85.64916	396.8905	1742.798	3018.351	7308.991
SWLSWOR1HK	6221.216	3285.6313	9.054814	18.75233	1.00076571	23185.22	767.3428	1578.475	78.77779	24.34394
SWLSWOR1FA	676.1037	1439.5012	7.514146	4.233443	1.46299083	872.9335	799.0864	486.6847	31.95779	13.77648
SWLSWOR1KL	565.1273	4509.1063	40.81123	153.3691	30.1290527	341.7481	652.713	1145.26	598.4072	497.9613
SWLSWOR1CV	1.945807	173.80356	77.83362	198.0869	230.091835	38.1932	223.8665	57.34762	59.31043	11.17671
SWLSW2R1HK	5787.423	5459.4351	75.5526	463.263	16.5680091	38318.26	138.2471	2776.205	493.9332	240.4462
SWLSW2R1FA	504.1158	952.62557	256.0786	1054.782	567.043655	354.3178	5.121588	483.3048	512.9828	558.3965
SWLSW2R1KL	2892.991	4766.013	262.6763	3079.435	743.841644	185.7392	27.24661	2725.889	2258.218	4396.202
SWLSW2R1CV	3.742972	768.53617	451.3994	3914.794	6680.86955	38.67174	6.628222	300.0534	1145.998	4054.576

Table A. 49: MSE result when the magnitude of outlier is 1, ρ = 0.999 and σ^2 = 1.

		σ^2=1	δ^2 = 1	k = 1						
ρ = 0.999			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	8303.227605	1279.85914	157.214673	308.414773	100.615548	871.581593	662.6010995	1089.68668	410.3011419	233.6186
SR1HK	67.02242964	13.83231242	4.91395859	5.93495642	3.85095276	70.9152395	33.36967108	37.3944496	15.07533445	11.65315
SR1FA	4.95991712	5.122119853	4.12108766	5.90151905	3.85597355	3.51232048	3.28013912	3.09682466	2.264708492	3.046268
SR1KL	4.625299055	4.976197159	3.79797449	5.81736559	3.93210205	2.13999407	2.189171677	2.68459783	2.992788429	5.096361
SR1CV	26.37744837	8.542374481	8.06369743	17.3502542	20.0217054	5.10998267	21.07965301	10.498914	22.16693409	34.0453
SWLSWOR1HK	381.0868944	36.84126825	1.82189281	2.06684467	1.3440002	88.8332154	40.62589796	17.7402123	5.117259135	1.668269
SWLSWOR1FA	4.903536498	7.104949332	1.74306824	1.81104489	1.37580005	5.29904767	2.760650596	2.56595607	1.06803006	1.61088
SWLSWOR1KL	5.700177143	6.548789118	2.52970731	2.63399382	1.77409808	2.28764226	1.881132729	2.33485964	2.534004684	2.454848
SWLSWOR1CV	1.677779154	7.423982831	2.98745046	4.82251793	1.98193062	3.44761807	1.116065697	2.80840911	5.633062345	2.695498
SWLSW2R1HK	27.62148538	18.37345577	1.54788414	2.04275503	1.56502934	6.93346748	0.900000839	4.43068334	3.514301557	2.951526
SWLSW2R1FA	1.874490105	1.900756077	1.06772039	1.70013312	1.41095933	1.34738815	0.900353696	1.31986253	1.3220349	1.444615
SWLSW2R1KL	2.257565734	2.895116813	1.25335625	2.44891196	2.11633571	1.793602	0.901493865	2.18413538	2.732132906	3.878413
SWLSW2R1CV	3.079734802	1.758236101	1.77486567	6.27758025	7.49547229	1.13386849	0.900839758	1.6302893	3.479559147	6.959524

Table A. 50: MSE result when the magnitude of outlier is 5, ρ = 0.999 and σ^2 = 1.

		σ^2=1	δ^2 = 1	k= 5						
ρ = 0.999			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	45837.98392	25006.73251	2019.94671	8526.90287	1825.74835	8671.72907	5322.120891	16914.1977	6836.91717	4384.652
SR1HK	9.62114064	17.02257146	7.50368576	14.1274313	5.84218823	65.4389436	21.20565343	21.9277954	8.085016643	9.363517
SR1FA	17.54000509	16.25502732	11.4039262	26.9088246	15.6719907	4.80777057	10.53296197	10.7212406	8.329604383	15.71157
SR1KL	12.93985005	18.67735113	10.5947943	27.5896688	14.9292568	5.98773301	12.30719405	14.5101829	11.33160929	20.32737
SR1CV	58.19422787	37.94965095	39.8002893	154.127946	145.062537	15.190172	5.847386129	119.919875	196.8453894	331.0134
SWLSWOR1HK	20.47986919	17.59530236	2.00944693	0.96395565	1.12636256	56.8920929	12.45677292	11.8525234	2.598532787	1.696907
SWLSWOR1FA	5.715202441	21.19400322	1.90645171	3.21222832	1.51084291	7.16702922	7.407393209	4.40624916	2.796803465	2.364721
SWLSWOR1KL	17.81330399	20.66211732	4.59391946	4.00202075	2.85405167	4.69180282	11.56645445	7.48352668	6.980281819	6.741315
SWLSWOR1CV	1.984705545	14.37964121	5.91118609	9.13902543	4.6817654	2.3696521	0.99464943	6.91673277	14.19958669	4.419815
SWLSW2R1HK	3.450488545	10.61287004	1.37922463	2.9975191	1.68519482	7.40634827	0.499999997	3.12343939	1.844843491	2.129556
SWLSW2R1FA	2.381948785	2.408239607	1.38249877	5.87615186	3.76407162	1.31693799	0.499999997	1.45951456	1.659608718	2.60127
SWLSW2R1KL	4.339872601	3.199139382	1.90152453	6.07467505	4.94652516	1.70511711	0.499999997	4.15683354	5.369051448	8.551382
SWLSW2R1CV	2.874089847	1.993571508	1.59651444	26.7282953	23.8377576	1.14622733	0.499999997	2.65992488	10.34194189	33.79279

Table A. 51: MSE result when the magnitude of outlier is 1, $\rho = 0.999$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	$k = 1$						
$\rho = 0.999$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	53873.17783	27052.5961	513.859681	2949.65561	718.570458	2705.79761	5917.331393	11621.9634	2497.307741	1624.01
SR1HK	31.82423621	34.01037529	4.410745	8.44325114	3.69345899	158.65162	208.1258904	32.023757	10.66894051	5.466084
SR1FA	13.97367662	20.15821095	5.48574885	13.1425927	7.35472338	4.25060456	12.01858905	8.51689516	3.768670119	6.597979
SR1KL	16.83224844	22.7165738	4.83636207	13.1394276	6.70096299	3.49340188	13.15186032	10.7278958	5.573497067	8.475514
SR1CV	5.231284964	8.032742652	12.0828071	27.5786394	52.7299512	7.44667546	14.41920775	14.5087113	53.76735509	99.14911
SWLSWOR1HK	2.716288254	23.35380571	1.10528295	1.11105186	0.96435926	19.9942881	75.542681	3.10384541	1.466512977	1.000003
SWLSWOR1FA	2.774780055	4.599112833	1.0987712	1.1142165	0.97605494	6.57348174	5.674830196	1.77525736	1.196111047	1.029556
SWLSWOR1KL	4.078116911	5.754176587	1.36892203	1.28138946	0.92268186	2.70120533	14.75425446	2.88230829	2.546391364	1.093053
SWLSWOR1CV	2.012608781	2.762747159	1.1390787	1.34132927	0.931889	3.1283553	1.001741585	2.0851169	2.346638573	1.033701
SWLSW2R1HK	2.490282714	12.51572411	1.0467852	3.29661228	0.96242637	30.4881263	0	7.25097745	2.03103646	1.361404
SWLSW2R1FA	2.653519521	1.884661187	1.04579746	2.07344284	1.30812426	1.75012481	0	1.70184995	1.450657212	1.38524
SWLSW2R1KL	2.817969238	3.570373619	1.11605408	2.93209116	1.54897298	2.59913562	0	3.49973298	2.572109352	3.438802
SWLSW2R1CV	3.412783285	2.358974893	2.04398726	10.4389205	10.6180652	1.25653032	0	2.44001284	6.355768634	14.99595

Table A. 52: MSE result when the magnitude of outlier is 5, $\rho = 0.999$ and σ^2=1.

		σ^2=1	$\delta^2 = 2$	k = 5						
$\rho = 0.999$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	99006.91644	175988.0007	7025.08113	48178.6965	12842.4006	22035.6179	43182.30545	148769.476	39694.52072	29519.22
SR1HK	10.6748813	29.36702587	6.45114582	19.8359886	4.29265876	146.880855	77.79145642	37.765157	10.14624872	8.54765
SR1FA	30.82783492	38.22114393	21.0395574	81.8665128	66.4572194	7.46625881	14.94349573	50.003124	31.96255615	63.22968
SR1KL	17.13724413	53.81745565	16.5265218	100.39208	55.757169	12.3803515	14.9308431	78.188002	37.13067797	64.22985
SR1CV	19.17617623	2.75600593	35.2318053	604.985013	578.091492	18.2060452	158.7149856	229.550098	431.5434891	1178.069
SWLSWOR1HK	4.463945104	8.327672576	1.07885524	1.07335944	0.98809035	21.4146047	10.34685978	3.04381486	1.181536921	1.003675
SWLSWOR1FA	3.496560896	9.43149401	1.10123387	1.13820227	0.98743886	9.08630251	6.496631545	4.38817855	1.462863854	1.133005
SWLSWOR1KL	6.718342884	11.38971383	1.75110883	2.13362349	1.23732242	5.80892826	7.332407537	11.8783645	4.958115072	1.933666
SWLSWOR1CV	3.635758754	6.77822762	1.65989429	2.92255553	1.72340433	5.11394744	1.020454667	3.44146082	5.445445005	1.162393
SWLSW2R1HK	32.3475342	7.362578306	0.99412357	1.5333994	1.01695189	31.3938313	3.062297544	5.4451714	1.639431334	1.412279
SWLSW2R1FA	7.795851693	4.541387019	1.75528042	11.3554066	6.35263946	1.94829074	0.914679059	3.56984519	3.610889095	4.422124
SWLSW2R1KL	10.185514	11.0300815	1.61836861	11.2837286	6.12886878	2.38694724	0.913720358	10.6695556	6.881883745	9.796513
SWLSW2R1CV	2.690809277	1.52957216	9.93515878	26.3423162	54.9808677	1.23830958	0.908896095	6.03703917	20.47518772	67.81595

Table A. 53: MSE result when the magnitude of outlier is 1, $\rho = 0.999$ and $\sigma^2 = 25$.

		$\sigma^2 = 25$	$\delta^2 = 1$	k = 1						
$\rho = 0.999$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	160747.7169	20014.67962	2329.01757	6883.6825	1941.52413	18270.9765	10645.02123	18008.1341	7189.440066	3802.521
SR1HK	2142.531427	310.7560099	137.666606	44.8249681	41.2569989	1604.75357	898.4531995	841.407518	382.1678865	262.1219
SR1FA	28.39139718	20.25014382	12.5071229	19.7175449	13.4340604	8.75161967	30.4090605	10.0288206	6.67417781	10.31145
SR1KL	53.89125966	25.94692957	16.176047	34.7716563	28.893971	14.5681899	37.97558932	31.8793066	43.32809385	72.97212
SR1CV	2.646391994	16.03943924	41.0623579	115.541235	84.2690703	22.4683736	38.48572246	56.0166496	137.3725422	198.4463
SWLSWOR1HK	534519.5101	17481.39897	134.52089	222.216412	106.53691	15364.8414	20991.4513	10804.7811	2531.467174	260.5999
SWLSWOR1FA	121.3405364	460.5539159	35.9860276	67.2742747	30.9311864	148.109638	458.8768815	110.808132	60.15570781	29.12641
SWLSWOR1KL	12.61585739	131.7811528	61.0699515	68.7208147	61.1186311	22.6994812	108.2744738	39.1011564	46.53599963	54.32119
SWLSWOR1CV	1.983736607	20.36074044	52.7852206	58.1795816	12.9906694	14.4215653	0.989011076	17.3116973	49.83980478	18.87511
SWLSW2R1HK	48194.58185	11263.13251	2029.56738	317.778114	162.312568	3095.30108	0	1728.9018	943.5551108	873.1759
SWLSW2R1FA	54.71631516	43.22745761	13.4523806	55.8593676	52.4455872	18.3648715	0	12.5340947	13.09171604	25.81607
SWLSW2R1KL	42.24910972	33.57768782	10.6938914	49.5140636	68.1818052	10.6827188	0	17.1018414	24.04576284	52.38784
SWLSW2R1CV	51.13590657	18.26836505	5.1158839	7.70143916	81.1292102	1.85467715	0	5.78056997	22.34205978	59.12086

Table A. 54: MSE result when the magnitude of outlier is 5, $\rho = 0.999$ and $\sigma^2 = 25$.

		$\sigma^2 = 25$	$\delta^2 = 1$	k = 5						
$\rho = 0.999$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	231738.2161	89228.38707	19081.3523	54264.6563	25887.1027	124194.421	92009.81025	196639.151	93433.52883	58283.33
SR1HK	1608.995971	111.2009718	61.1285444	132.581603	88.8433557	1777.25842	1735.041835	632.172315	229.752039	182.4684
SR1FA	53.68245625	44.47282167	52.0594609	95.0285483	118.271654	21.9706298	35.48829423	66.6611028	62.13117328	104.293
SR1KL	92.34958442	83.6355526	83.3497182	213.305755	229.934854	76.3819992	119.8331726	236.918525	214.5202231	312.9502
SR1CV	160.8456129	8.343358315	18.5975885	498.61548	47.9668116	49.9668299	460.0653989	357.613673	776.8291243	1769.223
SWLSWOR1HK	5778.458587	8247.804317	387.748371	306.170972	99.1790336	17850.3267	18616.30006	11407.9801	1670.891658	420.3933
SWLSWOR1FA	739.9217131	1809.130317	40.5243496	153.978415	39.7023183	346.523484	362.8642883	403.783855	386.094775	99.07511
SWLSWOR1KL	225.1637919	668.1743031	230.015112	178.829395	176.986619	117.34288	181.5251789	285.461	386.3898577	267.4424
SWLSWOR1CV	1.046785256	182.3381854	333.274669	109.167884	1.49363958	7.04764332	1.10099421	33.5753095	150.3322556	34.64196
SWLSW2R1HK	730.406408	184.6164209	250.340217	455.677713	310.643785	2909.49024	1.471459402	1363.5131	564.395944	622.8482
SWLSW2R1FA	53.57469508	126.9958714	41.5022826	341.305892	471.231009	18.9765445	0.895541306	44.8938798	87.12621003	260.633
SWLSW2R1KL	50.79169375	118.1376528	51.856263	494.019672	628.254805	10.5202152	3.972156839	109.683394	205.0273738	517.1389
SWLSW2R1CV	14.73997709	2.09882595	18.3904695	118.121401	265.877101	1.82307938	0.900157783	10.5604932	67.22111903	363.5338

Table A. 55: MSE result when the magnitude of outlier is 1, $\rho = 0.999$ and σ^2=25.

		$\sigma^2 = 25$	$\delta^2 = 2$	k = 1						
$\rho = 0.999$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	466643.7477	440102.3707	11716.5143	62008.2617	19448.758	63766.6683	152193.3287	263012.352	57346.58485	35883.19
SR1HK	1303.374179	722.4422324	51.818983	128.384178	151.846304	3967.55656	4125.059421	757.283916	230.4731155	103.1999
SR1FA	83.09972592	192.9888019	27.2828168	101.612326	129.288915	21.8956419	142.9654284	81.8422762	35.39549499	57.02102
SR1KL	172.2727871	408.2165562	37.4227179	218.157366	222.655119	50.705543	223.5250538	244.543433	127.5212538	162.7987
SR1CV	56.08242204	116.4425474	39.7653114	105.54221	985.905531	28.6851017	178.2740176	54.0489977	325.0083661	676.8606
SWLSWOR1HK	162.3184401	2740.411954	1.91304603	8.36555446	1.74298843	6633.64387	275.7317741	943.060335	153.9365227	1.485838
SWLSWOR1FA	60.98419389	463.1021314	1.80423924	2.84135388	0.90737041	184.782822	204.2954119	69.4780964	11.29920449	1.743661
SWLSWOR1KL	46.13941175	487.8835317	4.25510301	20.6813453	4.10689751	12.3818113	188.2102695	124.367979	56.20321369	8.516298
SWLSWOR1CV	3.780282197	44.07259355	3.18670692	15.9757289	1.7460694	7.01806783	1.000478486	10.0190036	16.01515422	5.96653
SWLSW2R1HK	1561.812317	3615.681068	88.3593153	1003.86026	4.30020285	16704.1508	0	2305.84886	580.0695857	198.044
SWLSW2R1FA	57.43281286	140.6001892	33.8228811	236.995333	108.806397	55.6765074	0	60.4726019	58.83378188	81.4228
SWLSW2R1KL	40.51049152	281.9408165	16.448847	200.833311	66.2535213	24.1126007	0	94.0700608	84.52715007	157.7973
SWLSW2R1CV	51.38947092	14.86362496	18.432336	157.181576	207.532126	4.8062927	0	13.8214278	53.9783063	175.7075

Table A. 56: MSE result when the magnitude of outlier is 5, $\rho = 0.999$ and σ^2=25.

		$\sigma^2 = 25$	$\delta^2 = 2$	k = 5						
$\rho = 0.999$			$p = 3$					$p = 6$		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	1799463.49	5340750.897	143687.587	832850.464	330589.417	462546.748	1374729.61	3063898.63	863866.5567	620612.4
SR1HK	249.7601229	1201.022292	84.7732567	387.692653	319.158878	3939.69632	198.7545468	964.682634	261.1954519	180.1061
SR1FA	173.898455	379.5108564	118.895274	298.150898	572.507335	52.2501842	157.2237188	268.7963	199.7649348	364.2503
SR1KL	428.8498843	2517.101008	262.462808	1666.71337	2073.19073	249.850204	396.1169398	1809.27358	920.6891913	1384.531
SR1CV	185.7475374	444.931608	162.880198	994.293629	9529.99436	67.9232767	136.2806869	584.16105	1190.002095	4786.504
SWLSWOR1HK	515.4454176	4711.513503	1.86914933	13.2890596	1.39717753	11608.672	7755.482933	1248.65253	77.94345668	2.079238
SWLSWOR1FA	259.348688	1824.012322	2.25283194	4.83240567	0.92855598	339.287566	577.6311552	277.835934	54.67440295	4.837883
SWLSWOR1KL	263.8607265	3375.095056	10.8853506	114.035147	11.3387946	81.0726328	466.7513124	868.084169	228.8454037	64.00722
SWLSWOR1CV	2.60468214	75.06070628	90.0175673	23.8801564	2.517444	12.0200962	0.941901772	13.1666448	62.55836802	21.35854
SWLSW2R1HK	2932.609949	4303.712434	15.5303692	659.045283	7.70614637	13852.2708	1335.201209	2428.8116	350.505586	281.7322
SWLSW2R1FA	1546.058885	532.3057398	138.949969	1159.36876	710.172695	56.1050869	2.243531438	328.79174	416.3585593	561.8319
SWLSW2R1KL	792.4977368	3091.020141	67.0072361	1579.08074	961.03094	24.1327817	8.873349126	850.652254	780.6556817	1520.488
SWLSW2R1CV	314.4191621	59.08911126	106.044017	1081.4593	192.510956	4.87616862	0.998287018	94.8589148	328.6765322	1021.331

Table A. 57: MSE result when the magnitude of outlier is 1, $\rho = 0.999$ and σ^2=100.

		σ^2= 100	δ^2 = 1	k = 1						
ρ = 0.999			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	212074.488	126990.7678	10971.8904	19013.5467	7533.30192	72612.884	42720.49929	69796.184	27996.90035	14663.9
SR1HK	20576.0561	116.0605229	317.678019	199.683192	78.5046408	6557.3067	3679.870165	3415.48482	1599.461843	1039.001
SR1FA	32.23126058	57.21906801	23.24665	41.3536303	28.6720534	20.988631	90.38579224	27.5882952	18.67090992	27.08914
SR1KL	80.32613859	102.0642241	44.8366792	117.716384	77.1337155	54.5598417	130.2833102	124.350719	172.4485526	280.381
SR1CV	10.85888852	1.059226571	38.0301734	179.981977	141.255576	36.5668504	114.3758142	103.779435	300.6972415	510.214
SWLSWOR1HK	1251858.995	5090.869705	1147.50556	3960.82666	1258.33803	246727.169	74904.01558	165707.698	39508.38083	3949.735
SWLSWOR1FA	1314.552392	1870.033354	124.649179	343.862803	138.070614	1015.84869	2682.007124	760.634538	571.3103401	175.8555
SWLSWOR1KL	51.82236028	106.8498943	94.3325389	188.311261	247.566924	62.186084	332.9919379	141.459846	285.7665709	237.4732
SWLSWOR1CV	150.5362519	2.728680238	141.902947	48.0664308	75.8750168	51.7403645	0.992114762	46.5045559	167.3665521	41.65355
SWLSW2R1HK	156360.1934	3854.462006	3131.99777	7243.02432	2157.87612	40608.0375	0	21177.4179	14399.10169	12568.9
SWLSW2R1FA	706.0278511	1659.911876	108.573584	632.30921	438.359325	104.975373	0	84.8596344	107.557598	245.9653
SWLSW2R1KL	133.643985	495.4147637	62.6966721	252.336969	342.871898	32.4164112	0	65.8706479	110.8624582	288.2765
SWLSW2R1CV	371.0987262	1.005676228	54.9967795	6.2769129	209.998659	7.26990856	0	19.6728642	43.0243911	169.7484

Table A. 58: MSE result when the magnitude of outlier is 5, $\rho = 0.999$ and σ^2=100.

		σ^2 = 100	δ^2 = 1	k = 5						
ρ = 0.999			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	2336325.163	749526.4253	78800.4686	316086.903	143406.83	482862.831	274187.4594	707916.764	354511.8405	219454.1
SR1HK	2779.021049	521.09274	322.641952	647.354875	791.642605	7108.92285	2741.477308	2668.177	948.9669946	722.8078
SR1FA	135.5192174	118.8500996	114.044415	235.218771	395.836755	53.1564714	124.8818241	152.112627	138.7845566	231.3865
SR1KL	487.7093748	407.3993278	361.011965	1055.71886	1319.33138	295.4675	835.3097797	931.047534	850.6378099	1203.051
SR1CV	2147.737785	202.642908	34.2501041	2261.96077	7310.60856	78.3162185	11.48990248	627.347309	1105.732241	3263.87
SWLSWOR1HK	739259.6824	101007.041	2581.71066	754.526095	4084.62125	284963.164	154573.1822	194917.21	27149.58415	6563.868
SWLSWOR1FA	3196.674516	13874.86148	283.749245	1417.02868	578.667988	2984.28833	2240.315019	3614.42271	3363.456035	691.767
SWLSWOR1KL	642.5029557	1509.418391	1018.13569	872.825801	2649.12911	383.082628	538.482595	1306.94397	2597.575398	1546.403
SWLSWOR1CV	1.995296636	308.9914803	3111.7968	328.346621	3.30910277	27.3159162	0.995470957	151.77931	757.3914405	136.8035
SWLSW2R1HK	107001.9612	52956.98507	8578.25807	14399.2193	4081.88244	49484.2334	0.499999997	18514.2909	9820.306827	10372.64
SWLSW2R1FA	302.2980425	853.8718328	652.992123	5628.48572	6482.78082	119.318837	0.499999997	403.611745	773.7829202	2363.837
SWLSW2R1KL	1696.356703	592.2596837	492.814186	5412.66218	5423.60468	34.2528794	0.499999997	699.849433	1527.400681	4786.718
SWLSW2R1CV	320.0524944	3.242712815	54.0013703	155.677636	424.383722	5.35733104	0.499999997	40.2948023	293.7306521	1760.25

Table A. 59: MSE result when the magnitude of outlier is 1, $\rho = 0.999$ and σ^2=100.

		σ^2 = 100	δ^2 = 2	k = 1						
ρ = 0.999			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	4808707.878	1464284.112	44330.198	244665.487	75907.8524	255321.298	611310.8111	1040348.5	227856.3844	141762.3
SR1HK	3270.207654	869.1573917	281.292836	493.201198	578.347036	15962.4541	16069.89406	2990.19705	980.2320654	405.487
SR1FA	404.9883262	310.4939377	64.1955244	221.598607	323.089341	58.106811	426.5490282	203.61241	88.33805397	138.4067
SR1KL	1442.15623	874.6100184	141.5763	833.927717	844.071443	200.147877	855.5407449	981.166766	516.061232	641.2558
SR1CV	148.5252029	222.4021106	70.3483915	242.96541	1897.3922	46.5267196	587.1495725	139.894967	445.6981651	1488.914
SWLSWOR1HK	3634.824924	43489.80214	7.27772141	97.8950294	9.70669964	99542.1643	4443.465312	14556.3291	2346.798106	8.79189
SWLSWOR1FA	481.3988962	1525.364719	3.57807711	9.66666462	0.70019871	1028.16906	1225.830601	465.542424	88.5740774	4.764867
SWLSWOR1KL	324.8185083	500.278855	13.7164653	141.535215	25.9145823	59.3503143	1001.290774	578.487941	263.498302	53.40502
SWLSWOR1CV	2.003453553	132.7298462	54.1969586	50.5700291	3.44907541	8.72773092	1.000347899	23.4924766	51.05585678	31.98582
SWLSW2R1HK	2280.232594	3438.349023	576.597262	14556.9344	51.9921692	293466.303	0	46018.7684	6603.606264	3322.01
SWLSW2R1FA	603.5392962	572.7614624	262.377086	2102.87143	1126.83738	358.58594	0	529.283597	584.6127427	813.5222
SWLSW2R1KL	830.0758673	1088.033765	101.046389	1407.56206	565.279175	103.461846	0	626.535627	663.2589678	1413.727
SWLSW2R1CV	574.8523432	20.7079176	49.4858203	843.610438	1068.60283	28.568548	0	64.649477	244.383356	694.2742

Table A. 60: MSE result when the magnitude of outlier is 5, ρ = 0.999 and σ^2=100.

		σ^2 = 100	δ^2 = 2	k = 5						
ρ = 0.999			p = 3					p = 6		
Estimators	15	20	30	50	100	15	20	30	50	100
OLS	6925706.804	12776854.6	563839.631	3969425.95	1271661.05	1855946.73	5682793.713	11982219.1	3417956.791	2438704
SR1HK	1007.830582	2141.937312	319.678542	1691.59746	1227.59932	15711.7286	784.4675809	3881.52894	1079.394374	714.9908
SR1FA	305.4103395	369.8036168	207.800558	455.953675	945.854881	116.848938	339.9283759	482.911435	343.8204426	605.7535
SR1KL	1658.418107	3565.813114	946.107008	7845.93866	8078.12923	999.363364	1625.779218	7197.97691	3713.77306	5468.129
SR1CV	506.2228159	11.07143894	263.901543	3505.61252	21587.757	107.863055	148.4657236	1203.76746	1783.453874	7454.201
SWLSWOR1HK	7799.948273	59773.47129	10.0365292	194.476932	1.57525831	177928.411	127857.7121	19866.4947	1219.220819	17.71863
SWLSWOR1FA	1749.803629	8315.146792	5.0924433	23.452527	0.70934328	1764.77086	4371.658643	1837.95804	375.1761149	19.39843
SWLSWOR1KL	1253.995903	5076.829316	47.2323346	533.721281	55.665168	405.564229	2118.924777	4798.15141	1499.805735	388.1135
SWLSWOR1CV	1.39429505	285.7615597	590.912937	170.562373	1527.7239	13.4521871	0.928970652	75.7164312	256.1929645	42.93602
SWLSW2R1HK	47213.51434	82645.21237	292.735678	5394.76459	97.847548	238574.557	32217.33112	41416.8442	5702.672288	4582.661
SWLSW2R1FA	12096.48617	2512.951811	1135.47235	6539.31569	4659.62644	366.470617	11.61217332	2382.46776	2998.837789	3879.266
SWLSW2R1KL	2912.231605	16243.23977	482.789699	9586.22877	6309.87789	123.644274	81.74138561	6732.44178	6315.153991	14427.79
SWLSW2R1CV	1202.840548	45.54131562	314.835585	3628.03467	338.776175	28.9640788	1.826927664	329.206713	1441.084985	5005.833